**GENERAL SPECIFICATIONS

Orase = Oba
[illegible]

SSD-680EX SPECIFICATIONS

GENERAL SPECIFICATIONS

Scanning method:	**Electronic convex sector scanning** Electronic linear scanning **Electronic steered linear scanning**
Display mode:	B (Multi-image display (2B, 3B or 4B) is possible.) Flow B (color blood flow display in B-mode image) B/M, B/PW Doppler simultaneous display and Flow B/PW Doppler simultaneous display M Doppler (PW or CW)
Memory capacity:	512 × 512 × 234 bit
Display gray shades:	256 display levels
Connectable probes :	26 kinds
Number of probe connectors:	For electronic multi-crystal probe : 2 connectors For independent probe : 1 connector
Viewing monitor:	10 or 12 inch RGB color monitor (monitor size is depending on the country) Up/down, swivel, tilt are possible
Preset function:	5 kinds, user programmable
Annotation presetting :	Possible up to 40 words.
Image polarity:	Positive (white on black) or negative (black on white), selectable on M-mode and D-mode image
Video output:	525 lines / frame, NTSC 3.58 or 625 lines / frame, PAL
Power requirement:	100 / 115 / 220 Vac ±10%, 50/60 Hz, Approx. 1000 VA
Dimensions:	Approx. 54 cm (W) × 91 cm (D) × 146 to 168 cm (H) (10 inch monitor type)
Weight:	Approx. 155 kg (10 inch monitor type)
Safety regulation:	Complies with IEC 601-1 Class 1, Type BF
Environment Requirements	
	In operation Temperature : + 10 to + 40 degrees C Relative humidity : 30 to 75 % (No condensing)
	In storage Temperature : - 10 to + 60 degrees C Relative humidity : 30 to 95 % (No condensing) Atmospheric pressure : 700 to 1060 mb

IMAGE ADJUSTMENT AND PROCESSING

B-mode image

Gain : Continuously variable between 30 and 60 dB
STC : 11-point slide control (common to M-mode)
Contrast : Changeable in 7 steps
Image processing : GAMMA 4 types (B&W image only)
(independent between viewing monitor and optional photography unit)
Preprocess Enhance 4 kinds (RELEEF)
Postprocess Enhance 4 kinds
(common to M-mode and D-mode)
Frame correlation ON/OFF
AGC changeable in 10-stage
FTC

Color flow image

Gain : Continuously variable
Image processing : Frame correlation ON/OFF
Color line density changeable in 2 steps
Rejection: 0 / 32 ~ 16 / 32 tones, changeable

M-mode image

Gain : Continuously variable between 30 and 60 dB
STC : 11-point slide control (common to B-mode)
Contrast : Changeable in 7 steps
Image processing : GAMMA 4 types (B&W image only)
(independent between viewing monitor and optional photography unit)
AGC
FTC
Echo erase

Doppler-mode image

Gain : Continuously variable in 7-stage
Image processing : GAMMA (B&W image only)
(independent between viewing monitor and optional photography unit)
Gain: Changeable in 7 steps
Rejection: 0 / 32 ~ 16 / 32 tones, changeable

B-mode SPECIFICATIONS

Image magnification	
Linear/convex sector:	×0.7, ×1, ×1.5, ×2, four steps changeable
Zoom :	Up to ×2 (magnification range dependent) (B and Flow B mode only)
Frame rate :	Max. 25 frames / sec.
Image scroll (up/down)	Available
Focal points	
In transmission:	Max. 4 points
In reception:	16 points
Image orientation:	Laterally and longitudinally changeable
Physiological signal display:	ECG

M-mode / DOPPLER-mode SPECIFICATIONS

Display method:	Scrolling
Scrolling speed:	Approx. 2, 4, 8, or 16 seconds/screen selectable
Physiological signal display:	ECG

CONVEX SECTOR IMAGING

Scanning angle:	Max. 90 degrees (probe dependent)
Probe frequency:	3.5 to 7.5 MHz (probe dependent★) ★ Probes are multi-frequency type. The indicated frequency is the dominant one.
Focusing method:	Full-range real-time dynamic focusing

LINEAR IMAGING

Scanning width:	Max. 97mm (Probe dependent)
Probe frequency:	3.5 to 7.5 MHz (probe dependent★) ★ Probes are multi-frequency type. The indicated frequency is the dominant one.
Focusing method:	Full-range Real-time Dynamic Focusing

SPECTRAL DOPPLER FUNCTION

Doppler method:	Pulsed wave Doppler/HPRF pulsed wave Doppler Continuous wave Doppler
Usable probe:	
PW/HPRF PW:	Linear / Convex sector probe
CW:	Independent probe
Display mode:	Power spectrum
Doppler analysis method:	FFT (Fast Fourier Transformation)
Doppler reference frequency:	2/2.5/3.5/5 MHz (probe dependent)
Analysis rate:	1 kHz to 25 kHz
PW Doppler velocity range :	± 5 cm/s ~ (Reference frequency 7MHz, PRF 1 kHz, Angle correction 0°) ? ± 273 cm/s 5,4 m/s (Reference frequency 3.5 MHz, PRF 25 kHz, Angle correction 80°)
CW Doppler velocity range :	± 5 cm/s to + 10 or - 10 m/s (Reference frequency 2 MHz)
Base line sift:	Possible to shift in 64 steps up to double in both directions
Spectrum inversion:	Possible (upside down)
Wall motion filter:	50/100/200/400/800 Hz changeable
Pre-compression curve:	Low, mid 1, mid 2 or High, changeable
Sample volume size:	1/2/3/5/10 mm
Angle correction :	Available on B-mode image

COLOR DOPPLER FUNCTION

Use of color :	Red : Toward flow Blue : Away flow Green : Turbulence (dispersion)
Gradation :	64 (32 each for red and blue) 16 for green
Color Display Mode :	Velocity / variance display 2 mode Velocity enhance dislpay 2 mode Variance display
Color Invert	Available
Wall motion filter:	4 types
Color Velocity Range:	± 4 cm/s (Reference frequency 5 MHz, PRF 0.5 kHz) ~ ±131 cm/s (Reference frequency 3.5 MHz, PRF 12 kHz)
Analysis rate :	1kHz~12kHz
Color Filter:	Low, mid 1, mid 2 and high, 4 steps changeable
Color Edge :	White on / off, color on / off
Color Display Area :	80, 50, 35 and 25% of the display width or display angle of B-mode image are selectable. Display range is movable in the horizontal direction. Display area in the depth direction is adjustable. Color display area follows the sampling point of PW Doppler.

PHYSIOLOGICAL SIGNAL DISPLAY FUNCTION
Model PEU-680 (OPTIONAL)

Display signal
    ECG : On B mode and M mode
Display position
    Possible to move with the knob : On M mode only
ECG synchronized display: 1 time phase possible

MEASURING AND CALCULATING FUNCTIONS

On B-mode image:

- Distance (4 channels)
- Area and circumference by either ellipse or trace method (4 channels)
- Volume (4 channels)
- Ratio
- Percent stenosis
- LV function (LV-AL)
- Gestational age (Cambel, Hannsmann, Tokyo university, Osaka university, USA)
- Fetal weight
- Histogram by either box or trace method (2 channels)

On M-mode image:

- Depth
- Time interval
- Velocity
- Heart rate
- LV function (Teichholz, Pombo)

Doppler :

- Velocity (4 channels)
- Acceleration (4 channels)
- Average flow velocity (4 channels)
- Valve area
    - Peak velocity, Peak pressure gradient,
    - Mean velocity, Mean pressure gradient,
    - Time to peak, Acceleration, Flow time
    - Pressure half time, Mitral / Tricuspid valve area
- PV (peripheral vessels) analysis
    - Pulsatility index / Purcelot index
- Stroke volume
- Cardiac output
    - Ejection time, Cross sectional diameter,
    - Cross sectional area, Stroke volume,
    - Heart rate, Cardiac output

(Measurement unit can be selected from among m/s, cm/s, and kHz.)

Report functions :

- OB report function available
- Interface with OB500 (Digisonics' Fetal Growth Analysis System)

CHARACTER DISPLAY

ID (Patient-identification number) : 8 characters × 4 lines

Date and time : Automatically displayed

Focal point : Automatically displayed (F1, F2, F3, F4 and broad)

Probe frequency : Possible to display automatically

Gain value : Automatically displayed

Heart rate : Automatically displayed when ECG is displayed (ECG display unit is optional.)

ECG synchronized timing : Automatically displayed when ECG synchronizing function is set. (ECG display unit is optional.)

Doppler velocity range : Automatically displayed

Character display within image area : Maximum 48 characters × 34 lines

Hospital name display area (text retention area) : 50 characters

Measurement value : Automatically displayed

Image scrolled position : Automatically displayed

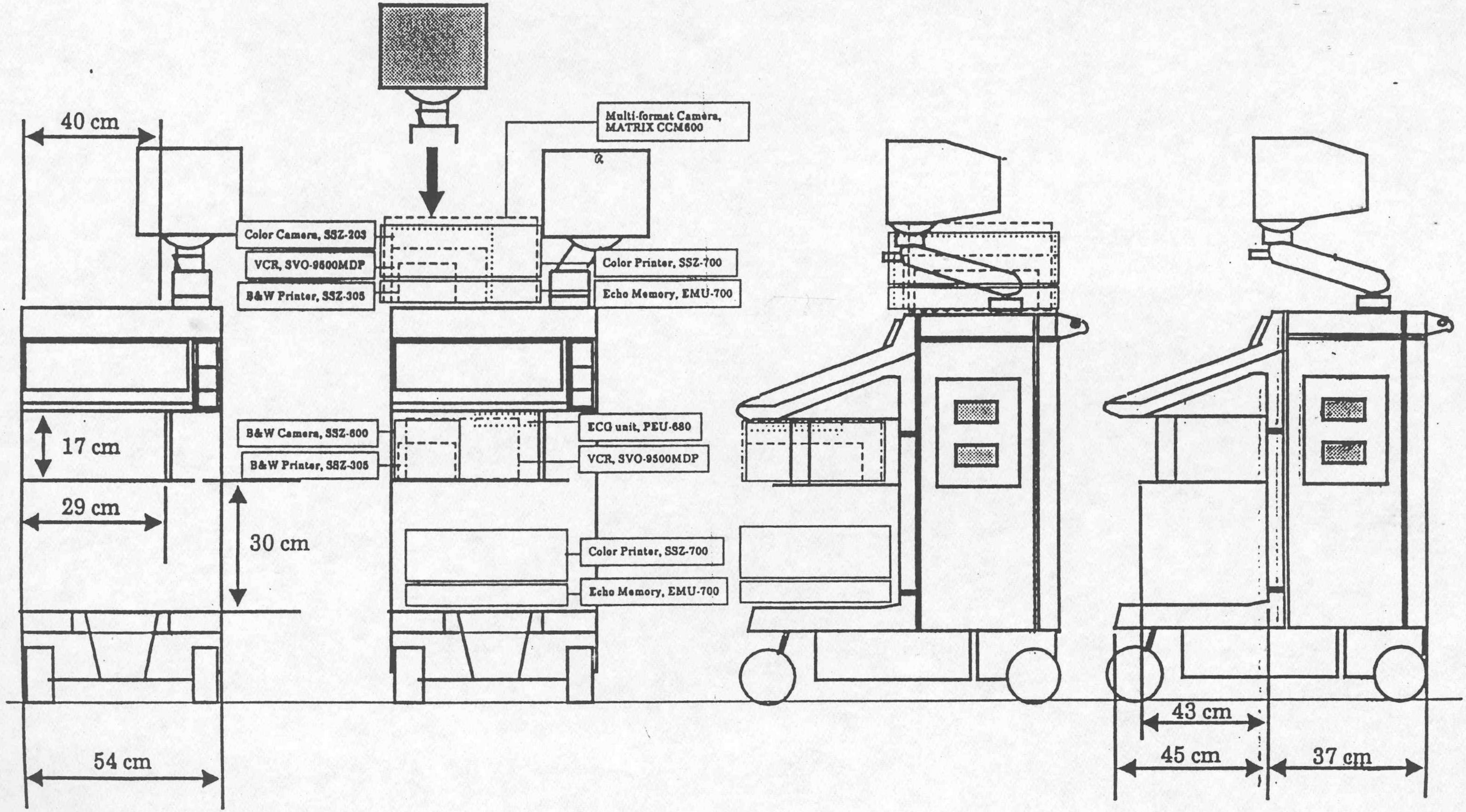
Gray scale & Color bar : Automatically displayed

Others : Automatically displayed items :
Distance scale mark, image orientation mark,
M-mode sampling cursor, M-mode time mark
Possible to display automatically items :
puncture guide line, body mark

※ The specifications may be subject to change without notice for improvement.

**SYSTEM STRUCTURE

OPTIONAL UNIT — Where to Install and Styles


40 cm
Multi-format Camera, MATRIX CCM600
Color Camera, SSZ-203
VCR, SVO-9500MDP
B&W Printer, SSZ-305
Color Printer, SSZ-700
Echo Memory, EMU-700
17 cm
B&W Camera, SSZ-600
B&W Printer, SSZ-305
ECG unit, PEU-680
VCR, SVO-9500MDP
29 cm
30 cm
Color Printer, SSZ-700
Echo Memory, EMU-700
54 cm
43 cm
45 cm
37 cm

OPTIONAL UNIT — Dimensions and Where to Install

● : Available

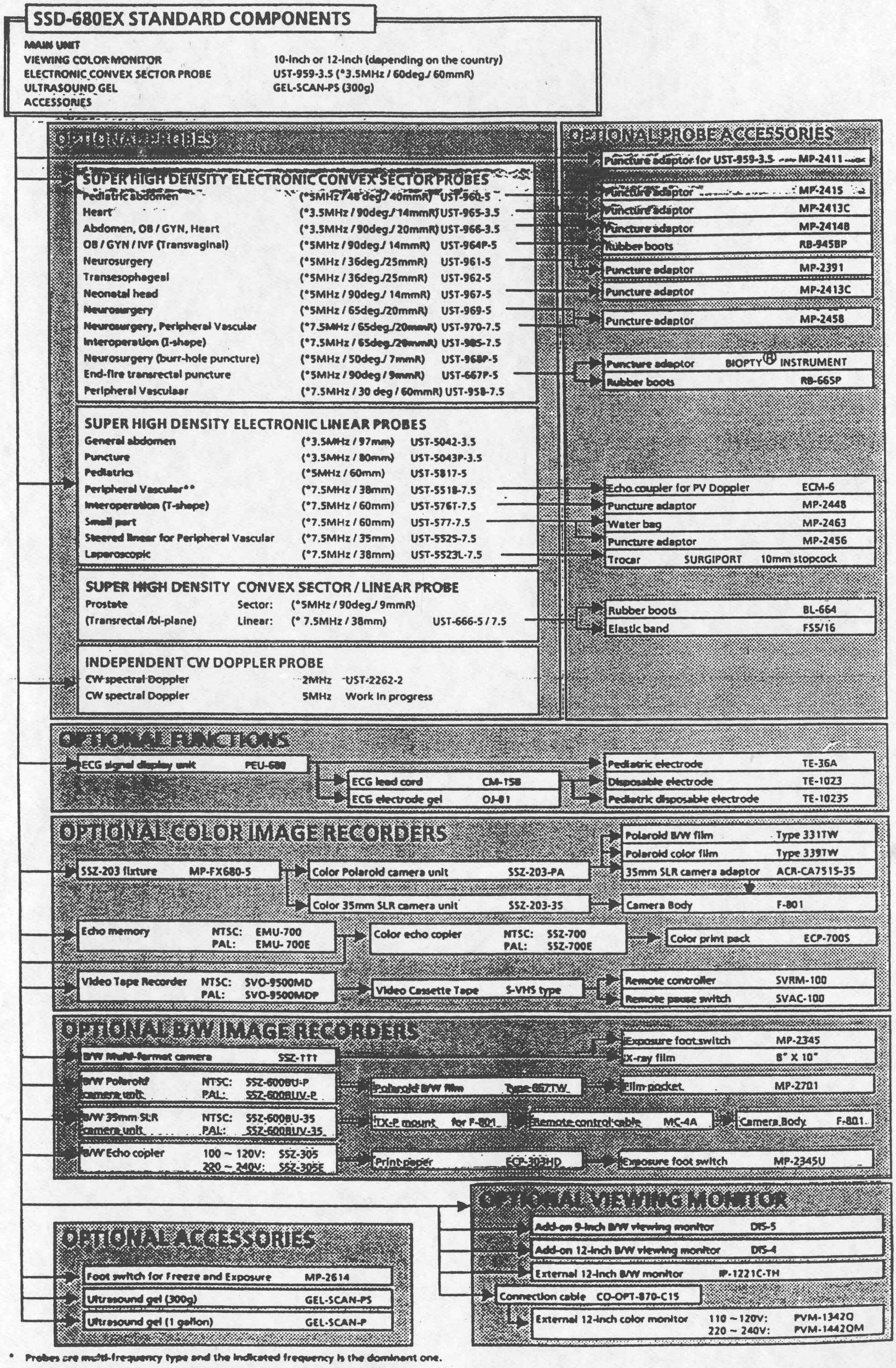
OPTIONAL UNIT	DIMENSIONS (W) × (H) × (D) cm	Where to Install			Remarks
		Top panel	Intermediate shelf	Caster frame	
ECG unit, PEU-680	16.5 × 5 × 25		●		Simultaneous mounting of this unit and VCR on the intermediate shelf not allowed.
VCR (SONY SVO-9500MD/MDP)	27 ×14.4 ×37	●	●		
B&W Printer, SSZ-305/305E	15.4 × 10.6 × 30	●	●		
B&W Camera unit, SSZ-600	12.5 × 14.2 × 36.5		●		Simultaneous mounting of this unit and VCR on the intermediate shelf not allowed.
Color printer, SSZ-700/700E	43 × 12.5 × 43.5	●		●	
Color Camera unit, SSZ-203	26 × 17 40	●			
Echo memory, EMU-700/700E	43 × 5.4 × 41.6	●		●	Install on the lower part of SSZ-700/700E.
Multi-format camera, (MATRIX CCM600)	38 × 19 × 46	●			IIE, model 400 may also be mounted.

Top panel: Only one unit among from VCR (SONY SVO-9500MD/MDP) or Color image recorder (SSZ-700 + EMU-700 or SSZ-203) may be mounted. B&W printer, SSZ-306/305E may be mounted only when the above units are not mounted.
The turning range of the motor arm is subject to a certain limitation when an option is mounted on the top panel.

Intermediate shelf: B&W image recorder, (SSZ-305/305E or SSZ-600) is fixed on the left edge.
Simultaneous mounting of both PEU-680 and SSZ-600 is not available when VCR (SONY SVO-9500MD/MDP) has been mounted.

Caster frame: Only one unit among from Multi-format camera and Color printer, SSZ-700/700E may be mounted.

SYSTEM CONFIGURATION FOR SSD-680EX



SSD-680EX STANDARD COMPONENTS

MAIN UNIT	
VIEWING COLOR MONITOR	10-inch or 12-inch (depending on the country)
ELECTRONIC CONVEX SECTOR PROBE	UST-959-3.5 (*3.5MHz / 60deg./ 60mmR)
ULTRASOUND GEL	GEL-SCAN-PS (300g)
ACCESSORIES	

OPTIONAL PROBES

SUPER HIGH DENSITY ELECTRONIC CONVEX SECTOR PROBES

Pediatric abdomen	(*5MHz / 48 deg./ 40mmR)	UST-960-5
Heart	(*3.5MHz / 90deg./ 14mmR)	UST-965-3.5
Abdomen, OB / GYN, Heart	(*3.5MHz / 90deg./ 20mmR)	UST-966-3.5
OB / GYN / IVF (Transvaginal)	(*5MHz / 90deg./ 14mmR)	UST-964P-5
Neurosurgery	(*5MHz / 36deg./25mmR)	UST-961-5
Transesophageal	(*5MHz / 36deg./25mmR)	UST-962-5
Neonatal head	(*5MHz / 90deg./ 14mmR)	UST-967-5
Neurosurgery	(*5MHz / 65deg./20mmR)	UST-969-5
Neurosurgery, Peripheral Vascular	(*7.5MHz / 65deg./20mmR)	UST-970-7.5
Interoperation (I-shape)	(*7.5MHz / 65deg./20mmR)	UST-985-7.5
Neurosurgery (burr-hole puncture)	(*5MHz / 50deg./ 7mmR)	UST-968P-5
End-fire transrectal puncture	(*5MHz / 90deg / 9mmR)	UST-667P-5
Peripheral Vasculaar	(*7.5MHz / 30 deg / 60mmR)	UST-958-7.5

SUPER HIGH DENSITY ELECTRONIC LINEAR PROBES

General abdomen	(*3.5MHz / 97mm)	UST-5042-3.5
Puncture	(*3.5MHz / 80mm)	UST-5043P-3.5
Pediatrics	(*5MHz / 60mm)	UST-5817-5
Peripheral Vascular**	(*7.5MHz / 38mm)	UST-5518-7.5
Interoperation (T-shape)	(*7.5MHz / 60mm)	UST-576T-7.5
Small part	(*7.5MHz / 60mm)	UST-577-7.5
Steered linear for Peripheral Vascular	(*7.5MHz / 35mm)	UST-5525-7.5
Laparoscopic	(*7.5MHz / 38mm)	UST-5523L-7.5

SUPER HIGH DENSITY CONVEX SECTOR / LINEAR PROBE

Prostate	Sector:	(*5MHz / 90deg./ 9mmR)	
(Transrectal /bi-plane)	Linear:	(* 7.5MHz / 38mm)	UST-666-5 / 7.5

INDEPENDENT CW DOPPLER PROBE

CW spectral Doppler	2MHz	UST-2262-2
CW spectral Doppler	5MHz	Work in progress

OPTIONAL PROBE ACCESSORIES

Puncture adaptor for UST-959-3.5	MP-2411
Puncture adaptor	MP-2415
Puncture adaptor	MP-2413C
Puncture adaptor	MP-2414B
Rubber boots	RB-945BP
Puncture adaptor	MP-2391
Puncture adaptor	MP-2413C
Puncture adaptor	MP-2458
Puncture adaptor	BIOPTY® INSTRUMENT
Rubber boots	RB-665P
Echo coupler for PV Doppler	ECM-6
Puncture adaptor	MP-2448
Water bag	MP-2463
Puncture adaptor	MP-2456
Trocar SURGIPORT	10mm stopcock
Rubber boots	BL-664
Elastic band	FS5/16

OPTIONAL FUNCTIONS

ECG signal display unit PEU-680

ECG lead cord CM-158

ECG electrode gel OJ-01

Pediatric electrode TE-36A

Disposable electrode TE-1023

Pediatric disposable electrode TE-1023S

OPTIONAL COLOR IMAGE RECORDERS

SSZ-203 fixture MP-FX680-5

Color Polaroid camera unit SSZ-203-PA

Color 35mm SLR camera unit SSZ-203-35

Polaroid B/W film Type 331TW

Polaroid color film Type 339TW

35mm SLR camera adaptor ACR-CA751S-35

Camera Body F-801

Echo memory NTSC: EMU-700 PAL: EMU-700E

Color echo copier NTSC: SSZ-700 PAL: SSZ-700E

Color print pack ECP-700S

Video Tape Recorder NTSC: SVO-9500MD PAL: SVO-9500MDP

Video Cassette Tape S-VHS type

Remote controller SVRM-100

Remote pause switch SVAC-100

OPTIONAL B/W IMAGE RECORDERS

B/W Multi-format camera SSZ-111

Exposure foot switch MP-2345

X-ray film 8" X 10"

B/W Polaroid camera unit NTSC: SSZ-600BU-P PAL: SSZ-600BUV-P

Polaroid B/W film Type 667TW

Film pocket MP-2701

B/W 35mm SLR camera unit NTSC: SSZ-600BU-35 PAL: SSZ-600BUV-35

TX-P mount for F-801

Remote control cable MC-4A

Camera Body F-801

B/W Echo copier 100 ~ 120V: SSZ-305 220 ~ 240V: SSZ-305E

Print paper ECP-303HD

Exposure foot switch MP-2345U

OPTIONAL VIEWING MONITOR

Add-on 9-inch B/W viewing monitor DIS-5

Add-on 12-inch B/W viewing monitor DIS-4

External 12-inch B/W monitor IP-1221C-TH

Connection cable CO-OPT-870-C15

External 12-inch color monitor 110 ~ 120V: PVM-1342Q 220 ~ 240V: PVM-1442QM

OPTIONAL ACCESSORIES

Foot switch for Freeze and Exposure MP-2614

Ultrasound gel (300g) GEL-SCAN-PS

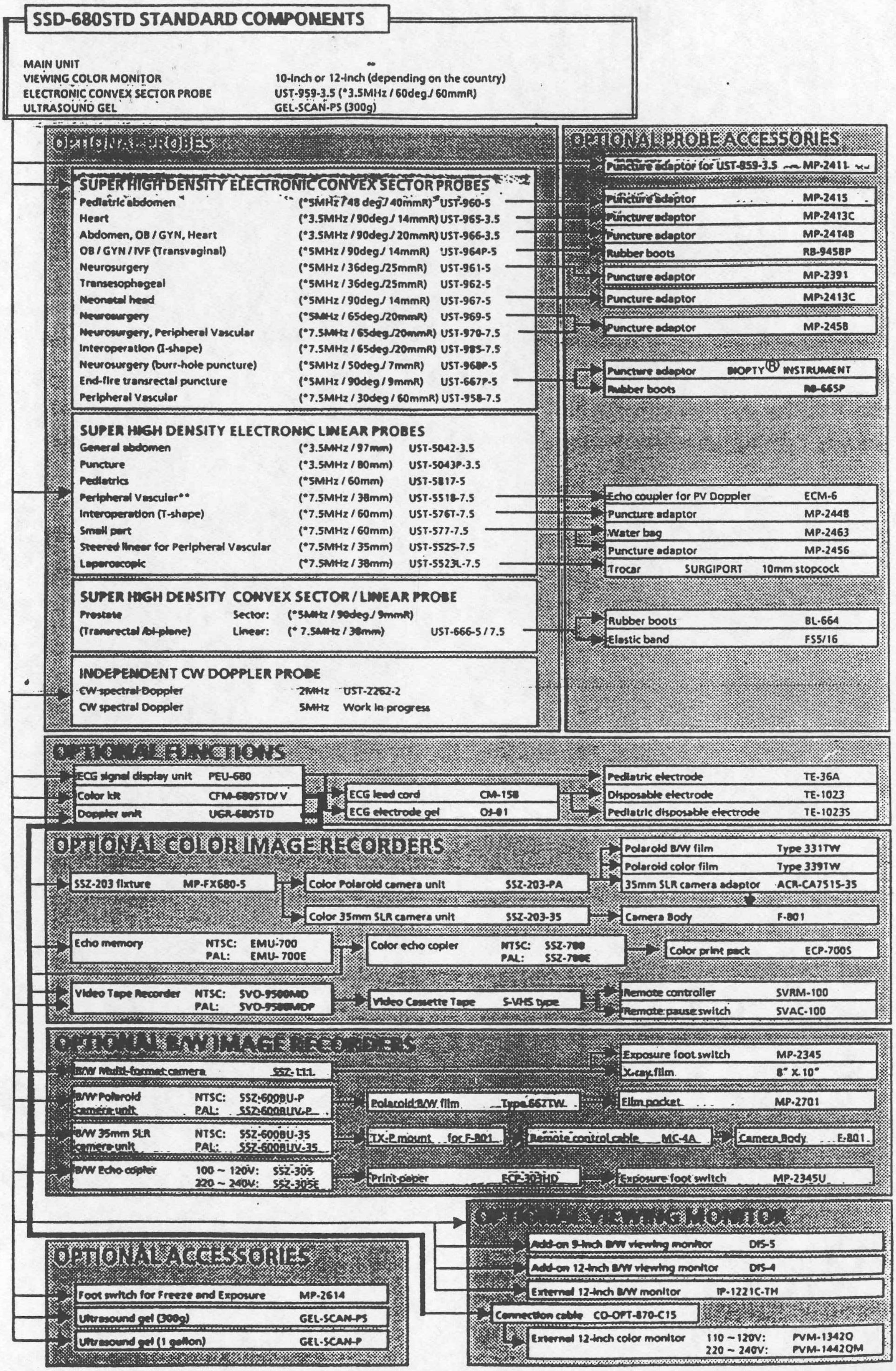
Ultrasound gel (1 gallon) GEL-SCAN-P

* Probes are multi-frequency type and the indicated frequency is the dominant one.

** Requires Echo coupler, model ECM-6 for peripheral vascular Doppler imaging.

*** The system configuration may be subject to change, without notice for improvement. Please confirm the latest configuration with Aloka Co., Ltd.

SYSTEM CONFIGURATION FOR SSD-680STD



SSD-680STD STANDARD COMPONENTS

MAIN UNIT	
VIEWING COLOR MONITOR	10-inch or 12-inch (depending on the country)
ELECTRONIC CONVEX SECTOR PROBE	UST-959-3.5 (*3.5MHz / 60deg./ 60mmR)
ULTRASOUND GEL	GEL-SCAN-PS (300g)

OPTIONAL PROBES

SUPER HIGH DENSITY ELECTRONIC CONVEX SECTOR PROBES

Pediatric abdomen	(*5MHz / 48 deg./ 40mmR)	UST-960-5
Heart	(*3.5MHz / 90deg./ 14mmR)	UST-965-3.5
Abdomen, OB / GYN, Heart	(*3.5MHz / 90deg./ 20mmR)	UST-966-3.5
OB / GYN / IVF (Transvaginal)	(*5MHz / 90deg./ 14mmR)	UST-964P-5
Neurosurgery	(*5MHz / 36deg./25mmR)	UST-961-5
Transesophageal	(*5MHz / 36deg./25mmR)	UST-962-5
Neonatal head	(*5MHz / 90deg./ 14mmR)	UST-967-5
Neurosurgery	(*5MHz / 65deg./20mmR)	UST-969-5
Neurosurgery, Peripheral Vascular	(*7.5MHz / 65deg./20mmR)	UST-970-7.5
Interoperation (I-shape)	(*7.5MHz / 65deg./20mmR)	UST-985-7.5
Neurosurgery (burr-hole puncture)	(*5MHz / 50deg./ 7mmR)	UST-968P-5
End-fire transrectal puncture	(*5MHz / 90deg / 9mmR)	UST-667P-5
Peripheral Vascular	(*7.5MHz / 30deg / 60mmR)	UST-958-7.5

SUPER HIGH DENSITY ELECTRONIC LINEAR PROBES

General abdomen	(*3.5MHz / 97mm)	UST-5042-3.5
Puncture	(*3.5MHz / 80mm)	UST-5043P-3.5
Pediatrics	(*5MHz / 60mm)	UST-5817-5
Peripheral Vascular**	(*7.5MHz / 38mm)	UST-5518-7.5
Interoperation (T-shape)	(*7.5MHz / 60mm)	UST-576T-7.5
Small part	(*7.5MHz / 60mm)	UST-577-7.5
Steered linear for Peripheral Vascular	(*7.5MHz / 35mm)	UST-5525-7.5
Laparoscopic	(*7.5MHz / 38mm)	UST-5523L-7.5

SUPER HIGH DENSITY CONVEX SECTOR / LINEAR PROBE

Prostate	Sector:	(*5MHz / 90deg./ 9mmR)	
(Transrectal /bi-plane)	Linear:	(* 7.5MHz / 38mm)	UST-666-5 / 7.5

INDEPENDENT CW DOPPLER PROBE

CW spectral Doppler	2MHz	UST-2262-2
CW spectral Doppler	5MHz	Work in progress

OPTIONAL PROBE ACCESSORIES

Puncture adaptor for UST-959-3.5	MP-2411
Puncture adaptor	MP-2415
Puncture adaptor	MP-2413C
Puncture adaptor	MP-2414B
Rubber boots	RB-945BP
Puncture adaptor	MP-2391
Puncture adaptor	MP-2413C
Puncture adaptor	MP-2458
Puncture adaptor	BIOPTY® INSTRUMENT
Rubber boots	RB-665P
Echo coupler for PV Doppler	ECM-6
Puncture adaptor	MP-2448
Water bag	MP-2463
Puncture adaptor	MP-2456
Trocar SURGIPORT	10mm stopcock
Rubber boots	BL-664
Elastic band	FS5/16

OPTIONAL FUNCTIONS

ECG signal display unit	PEU-680
Color kit	CFM-680STD/ V
Doppler unit	UGR-680STD
ECG lead cord	CM-158
ECG electrode gel	OJ-01
Pediatric electrode	TE-36A
Disposable electrode	TE-1023
Pediatric disposable electrode	TE-1023S

OPTIONAL COLOR IMAGE RECORDERS

SSZ-203 fixture	MP-FX680-5
Color Polaroid camera unit	SSZ-203-PA
Color 35mm SLR camera unit	SSZ-203-35
Polaroid B/W film	Type 331TW
Polaroid color film	Type 339TW
35mm SLR camera adaptor	ACR-CA7515-35
Camera Body	F-801
Echo memory	NTSC: EMU-700 PAL: EMU- 700E
Color echo copier	NTSC: SSZ-700 PAL: SSZ-700E
Color print pack	ECP-700S
Video Tape Recorder	NTSC: SVO-9500MD PAL: SVO-9500MDP
Video Cassette Tape	S-VHS type
Remote controller	SVRM-100
Remote pause switch	SVAC-100

OPTIONAL B/W IMAGE RECORDERS

B/W Multi-format camera	SSZ-111
B/W Polaroid camera unit	NTSC: SSZ-600BU-P PAL: SSZ-600BUV-P
B/W 35mm SLR camera unit	NTSC: SSZ-600BU-35 PAL: SSZ-600BUV-35
B/W Echo copier	100 ~ 120V: SSZ-305 220 ~ 240V: SSZ-305E
Exposure foot switch	MP-2345
X-ray film	8" X 10"
Polaroid B/W film	Type 667TW
Film pocket	MP-2701
TX-P mount	for F-801
Remote control cable	MC-4A
Camera Body	F-801
Print paper	ECP-303HD
Exposure foot switch	MP-2345U

OPTIONAL VIEWING MONITOR

Add-on 9-inch B/W viewing monitor	DFS-5
Add-on 12-inch B/W viewing monitor	DFS-4
External 12-inch B/W monitor	IP-1221C-TH
Connection cable	CO-OPT-870-C15
External 12-inch color monitor	110 ~ 120V: PVM-1342Q 220 ~ 240V: PVM-1442QM

OPTIONAL ACCESSORIES

Foot switch for Freeze and Exposure	MP-2614
Ultrasound gel (300g)	GEL-SCAN-PS
Ultrasound gel (1 gallon)	GEL-SCAN-P

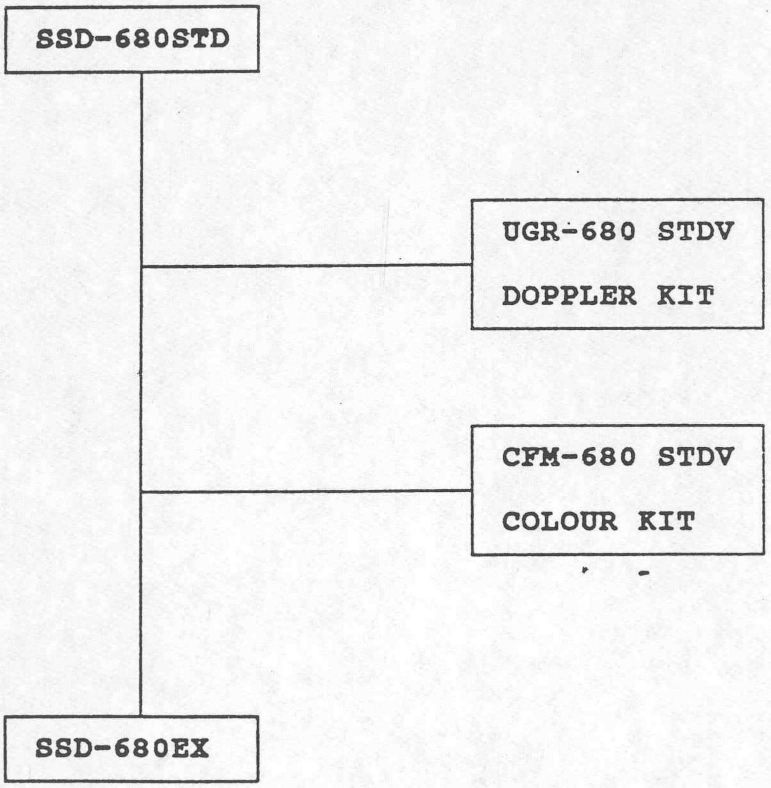
* Probes are multi-frequency type and the indicated frequency is the dominent one.

** Requires Echo coupler, model ECM-6 for peripheral vascular Doppler imaging.

*** The system configuration may be subject to change, without notice for improvement. Please confirm the latest configuration with Aloka Co., Ltd.

SSD-680STD >>>>>>>>> SSD-680EX

UPGRADING


SSD-680STD
UGR-680 STDV
DOPPLER KIT
CFM-680 STDV
COLOUR KIT
SSD-680EX

**APPLICATION CONFIGURATION

* APPLICATION CONFIGURATION:

A. RADIOLOGY
B. OBSTETRICS/GYNAECOLOGY
C. VASCULAR LABORATORIES
D. SURGERY
E. UROLOGY

A. CONFIGURATION FOR RADIOLOGY :

1. UST - 959 - 3.5 (standard probe,60deg,60mmR convex sector)

   Application: - general abdominal

2. UST - 960 - 5.0 (48deg,40mmR convex sector)

   Application:
   - kidneyscanning (within 8cm depth)
   - superficial abdominal organs
   - pediatric abdominal
   - small adults abdominal
   - deeper peripheral vascular imaging

3. UST - 577 - 7.5 (60mm linear)

   Application:
   - thyroid
   - testis
   - breast
   - appendix
   - muscles
   - shoulder
   - tendons
   - menisci
   - hip angle

4. UST - 5525 - 7.5 (38mm linear, 15deg steered linear)

   Application:
   - superficial peripheral vascular scanning
   - alternative probe for small parts (no.3)

5. UST - 576T - 7.5 (60mm, T - shape linear)

   Application:
   - intraoperative for liversurgery,pancreas surgery etc.
   - alternative probe for small parts imaging appendix, thyroid, muscles, tendons

6. UST - 966 - 3.5 (90deg,20mmR convex sector)

   Application: - abdominal intercostal scanning

B.CONFIGURATION FOR OBSTETRICS AND GYNACOLOGY:

1. UST - 959 - 3.5 (60deg,60mmR convex sector)

   Application: - general gynaecology and obstetrics

2. UST - 5042 - 3.5 (alternative for doctors who prefer linear probe 97mm linear)

   Application: - general gynaecology and obstetrics

3. UST - 964P - 5 (90 deg, 14mmR convex sector)

   Application:
   - transvaginal
   - early pregnancy
   - tumorvascularisation
   - IVF - application

4. UST - 960 - 5 (48 deg, 40mmR convex sector)

   Application:
   - early pregnancy
   - higher resolution images for structures within 10 cm

5. UST - 966 - 3.5 (90deg,20mmR convex sector)

   Application: - fetal cardiology

Note:
- This probe offers higher frame rate compared with the UST - 959 - 3.5 in CFM - imaging.
- B - mode quality is decreased

C. CONFIGURATION FOR VASCULAR LABORATORIES:

1. UST - 5525 -7.5 (38mm linear, 15 deg steered linear)

   Application:
   - superficial peripheral vascular imaging
   - femoral bypasses, shunts)

2. UST - 960 - 5.0 (48deg, 40mmR convex sector)

   Application:
   - deeper peripheral vascular imaging
   - DVT imaging
   - pelvic vascular imaging

3. UST - 970 - 7.5 (65deg, 20mmR convex sector)

   Application:
   - suitable probe for better approach in carotid imaging (origin and higher located internal and external branches)

D. CONFIGURATION FOR SURGERY :

1. UST - 576T - 7.5 (60mm T - shape linear)

Application: - liversurgery and pancreassurgery

2. UST - 985 - 7.5 (65deg, 20mmR finger type convex sector)

Application:
- liversurgery and pancreassurgery
- better approach
- less resolution as UST - 576T - 7.5

2. UST - 970 - 7.5 (65deg, 20mmR convex sector)

Application:
- neurosurgery
- vascularsurgery, for example checking grafts

4. UST - 968P- 5.0 (50deg, 7mmR convex sector)

Application:
- burrhole neurosurgery
- biopsy capability

5. For non - intraoperative imaging vascular application:

See configuration vascular laboratories

6. UST - 5523L - 7.5 (38mm linear, 10mm diameter,long type)
(length of probe 50,5 cm)

Application:
- laparoscopic surgery
- staging liver/pancreas pathology
- evaluate gall bladder and hepatic ducts during laparoscopic surgery

E. CONFIGURATION FOR UROLOGY:

1. UST - 959 - 3.5 (60deg,60mmR convex sector)

   Application: - transabdominal scanning.
   - kidneys
   - prostate

2. UST - 666 - 5.0/7.5 (5MHz convex 90deg/9mmR)
   (7.5MHz linear 38mm)

   Application: - transrectal biplane imaging of prostate
   - transperineal biopsy capability

3. UST - 667P - 5.0 (90deg,9mmR convex sector endfire)

   Application: - transrectal imaging with transrectal biopsy capability of the prostate

**NEW FUNCTIONS FOR OPERATION

****NEW FUNCTIONS FOR OPERATION**

- WALL FILTER
- LINE DENSITY
- VARIABLE SCANNING AREA
- HORIZONTAL FUNCTION IN COLOR AVERAGE
- VELOCITY RANGE SELECTION
- BODY MARKERS OPERATION
- APPLICATION (FLOW MENU)

WALL FILTER

The wall filters are used to eliminate unwanted signals from slow moving organs and strong reflecting structures such as vessels walls. These unwanted signals causes color motion artifacts.

On the SSD680EX we have developed a new 6 stage color filter.

Following options are available in the menu:

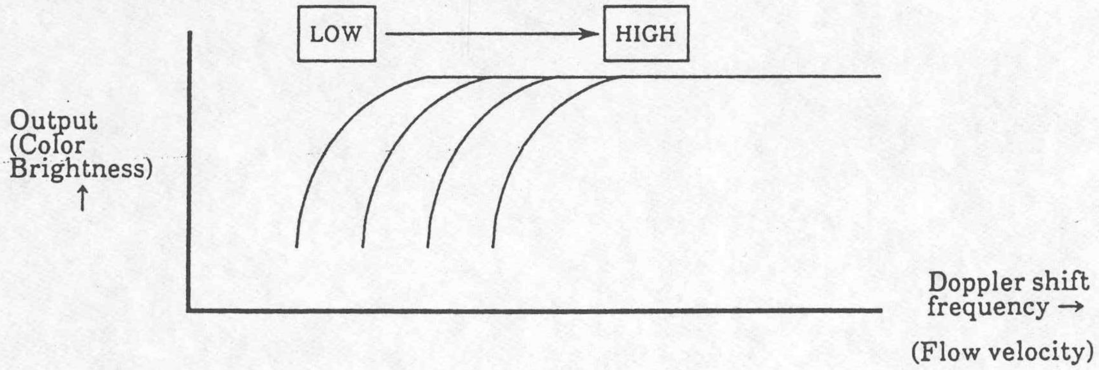
LOCATION

FLOW MENU → MENU PAGE-1 | 1 WL FILT

MENU

FLOW FILTER	1	2	3	4	5	6
	EXIT	LOW	MID.1	MID.2	HIGH	

Each sets the cut-off frequency of the low-cut filter as shown below:



For displaying the lowest detectable velocity in CFM imaging we have to use the low setting.
To calculate the lowest detectable velocity we have a factor 0.12 for this low setting.
When we use a pulse repetition frequency of 500 Hz , we have a cut off frequency of 60 Hz.
This a technical theoretical explanation. In reality it is possible that we can display flow below this level. This depends on the amplitude of the signals we receive.

LINE DENSITY

FUNCTION

The LN DENS changes line density for color image.

LOCATION

FLOW MENU → PAGE-1 | 5 LN DENS

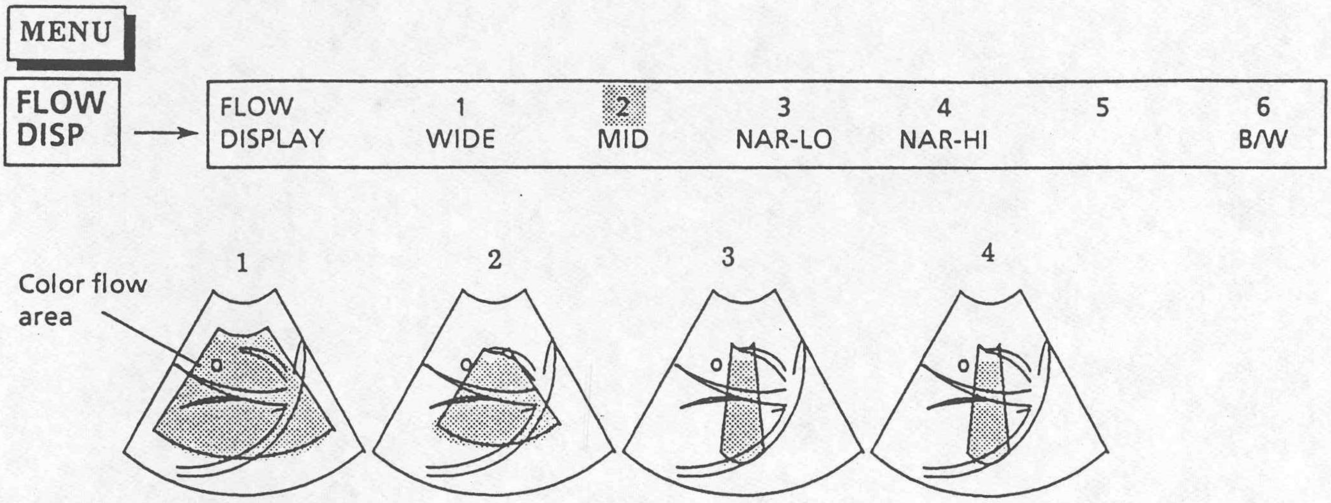
Each time the 5 switch is pressed, the line density for color image changes between low (B/W 1 : color 1) and high (B/W 1 : color 2). (Standard setting is low.)

Low:	Select low line density to observe large vessels. When low line density is selected, smoothing is applied between adjacent lines. Frame rate is higher compared to high line density.
High:	Select high line density to observe small vessels. When high is selected, smoothing is not applied.

Changing the line density will result in more precise, higher resolution colour flow imaging.In small thiny vessels this function can be useful to display these vessels as accurate as possible.
This option will decrease the frame rates.Off course this can be adjusted by correcting color average to low setting,flow display on narrow setting and B/W display on 60% setting.

VARIABLE SCANNING AREA IN B/FLOW MODE.

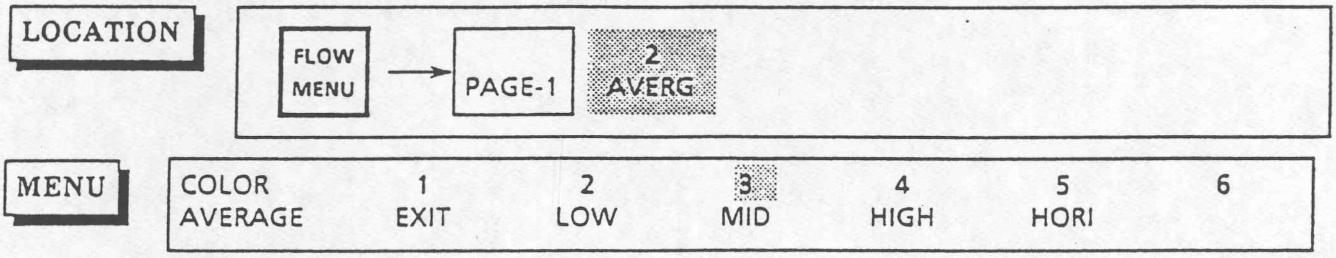
In the flow display menu is added a new function, B/W (6)


MENU
FLOW DISP
FLOW DISPLAY
1 WIDE
2 MID
3 NAR-LO
4 NAR-HI
5
6 B/W
Color flow area
1
2
3
4

Changing the field of view will result in higher frame rates and will result in reduced color motion artifacts. By pressing switch 6 , the field of view will reduce 40%.

COLOUR AVERAGE

This function is related to the colour sensitivity. Increasing the pulses per line will increase the accuracy of the detection of slow flows , but as it takes more time to transmit more pulses, the frame rate will be decreased.
In the menu we can see a new function:


LOCATION
FLOW MENU
PAGE-1
2 AVERG
MENU
COLOR AVERAGE
1 EXIT
2 LOW
3 MID
4 HIGH
5 HORI
6

Horizontal smoothing (5) is added. This function will not give just vertical smoothing as on the spatial filter, but also horizontal smoothing.Both function works as noise rejection. Spatial filter works as signal selection , so sometimes weak signal will drop out.
The hori averaging works as signal averaging , so signal drop out will be minimum.

VELOCITY RANGES

More steps in velocity ranges are available now. Previously we had just one step between 6 - 22 cm/s, (11cm/s) This is a example for the 3.5 Mhz probe with 15cm depth range.

Now we can use following steps:
- 6 cm/s
- 8 cm/s
- 11 cm/s
- 14 cm/s
- 16 cm/s
- 22 cm/s
- 32 cm/s
- 44 cm/s
- 65 cm/s
- 88 cm/s

Automatically depthrange is decreased, when we select higher prf. This has been done to achieve higher frame rates.

Body Mark Display

<Function>

Displays a body mark suitable for the object of diagnosis.
There are 19 body marks which fall into four groups. (See next page for the figures.)

<Use>

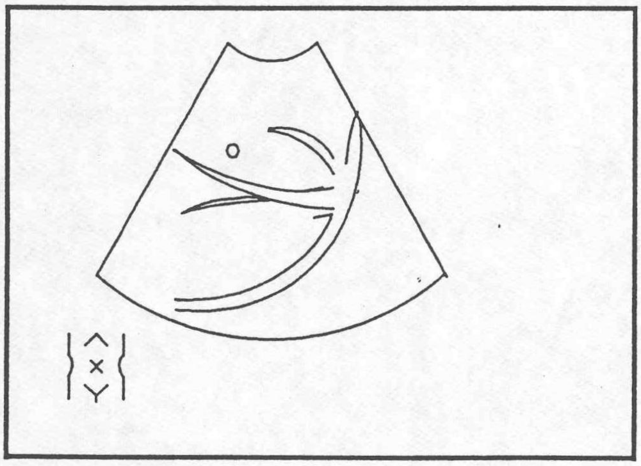
BDY-MK (BODY MARK)

MENU → 6 NEXT → 6 NEXT → INDICATION → 2 BDY-MK → BODY MARK

a. Select **2 BODY-MK** in the INDICATION menu. The BODY MARK menu below will be displayed.

BODY MARK	1	2	3	4	5	6
	EXIT	ABDOMEN	OB/GY	HEAD	BREAST	NEXT

b. Select the body mark group you want from the above menu and press the switch.
The first body mark of the group is displayed at the lower left of the screen.



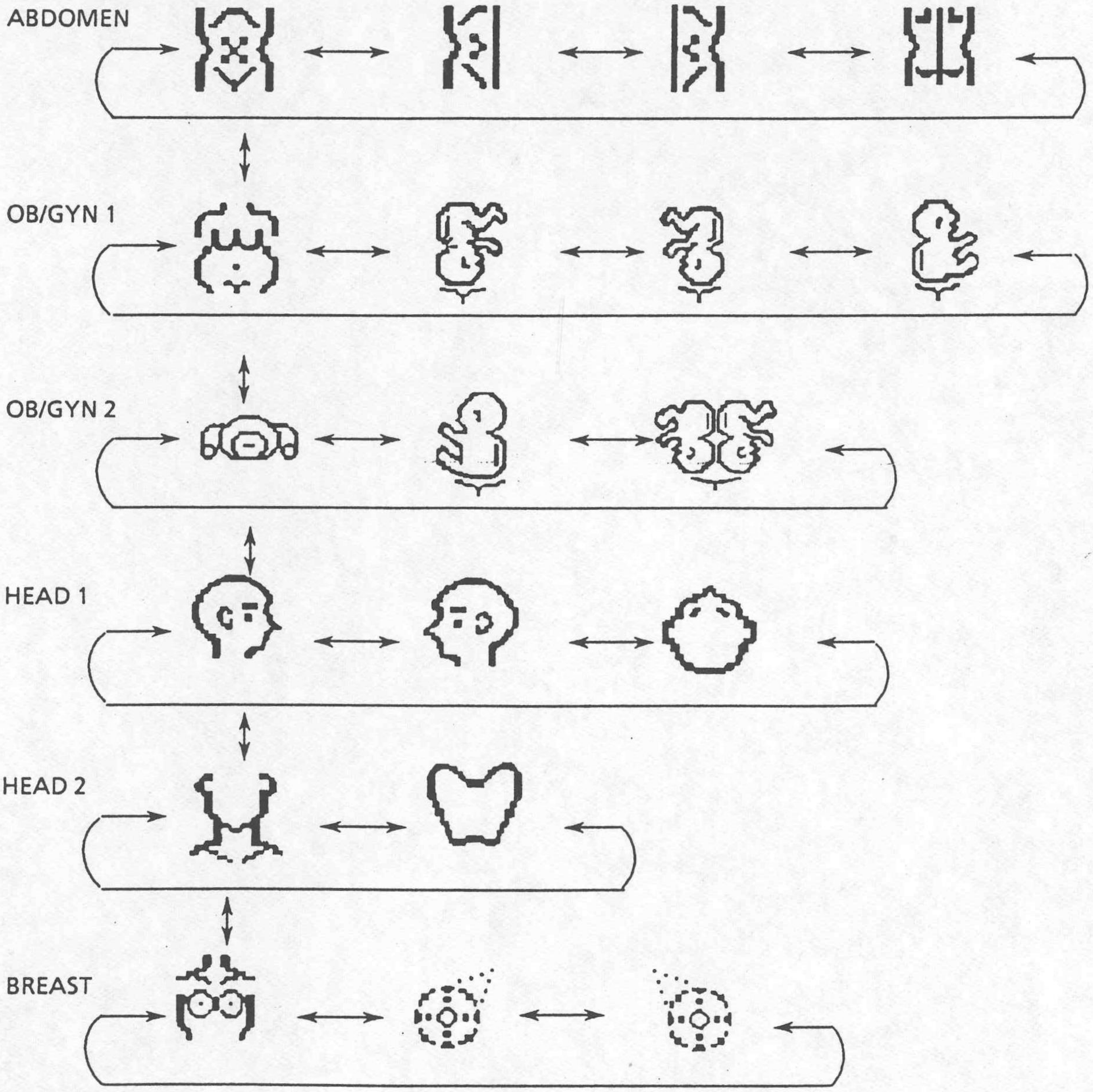
For example, when ABDOMEN is selected, the above figure appears.

To display another body mark:

Using the trackball, move the probe mark to the extreme right. Then roll the trackball furthermore. The body mark changes as shown below.

- Turning the trackball left changes the body mark in reverse.
- Turning the trackball up or down changes the body mark group as shown below.

<Body marks>


ABDOMEN
OB/GYN 1
OB/GYN 2
HEAD 1
HEAD 2
BREAST

Probe Mark Setting

The probe mark is useful for keeping track of where the probe is being applied.

<Use>

a. Select a body mark suitable for the displayed image.

b. Roll the trackball to position the probe mark to an appropriate location.

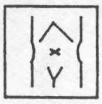
c. Press the **MARK REF** switch to change the direction of the probe mark, if necessary. Rolling the trackball to the right turns the probe mark clockwise.

Each time the MARK REF switch is pressed, steps b. and c. are altered.

[Note]

A body mark can be displayed regardless of image freezing.

<Erasing the body mark>

- Press the  switch.

NOTE: When the switch is not lighting press the switch twice to erase the body mark.

APPLICATION

There are two selections available in the flowmenu. Generally the received echo from cardiac cavity is stronger than from bloodvessels in the abdomen. A change of the window of the input signal to the colorcalculator is needed. Using cardio setting for the abdominal application, you might lose the signal of the weak echos. On the other hand overflow can occur if abdomen setting is used in cardiac application!!!!!

** PRESETTINGS

PRESETTINGS SSD 680 EX :

A. RADIOLOGY

1. GENERAL ABDOMINAL
2. KIDNEY vascularisation and other thiny vessels
3. AORTA
4. THYROID

B. OBSTETRICS AND GYNACOLOGY:

1. UMBILICAL CORD . (use abdominal setting)
2. PLACENTAL FLOW , CEREBRAL BLOOD CIRCULATION (kidneysetting)
3. FETAL HEART

C. VASCULAR LABORATORIES:

1. LARGE VESSELS HIGH FLOWS (arterial flow)
2. LARGE VESSELS LOWER FLOW (venous flow)
3. SMALL VESSELS (arterial flow)
4. SMALL VESSELS (venous flow)

Dop Control (Abdominal)

	Initialize		Program		
Vel.Range		[✓ 2KHZ]	4KHZ	6KHZ	8KHZ
Filter	[✓ 50HZ]	100Hz	200HZ	400HZ	800HZ
Sample Vol	1mm	2mm	[✓ 3mm]	5mm	10mm
Pre Comp	low	mid1	mid2	[✓ high]	
Reject	(00/14)				
Base Line	low	midl	[✓ cent]	midh	high
Invert	[✓ norm]	invert.			
Unit	m/s	[✓ cm/s]	KHZ		

Flow Control (Abdominal)

			Program		
Color disp	V/Var1	V/Var2	Var	V-Enh1	[✓ V-Enh2]
Vel Range	0.5KHZ	[✓ 1KHZ]	2KHZ	4KHZ	6KHZ
Filter	Low	Mid1	[✓ Mid2]	High	
Col Avrg	Low	[✓ Mid]	High	Hori	
Col Rej	(00,32)				
Disp Area	Wide	Mid1	[✓ Mid2]	Narr	
Area Lock	Off	[✓ On]			
Color edge	[✓ Color-cut (25-63)]		[✓ White-cut (25-63)]		
Flow Enh	Low 2	Low1	STD	[✓ High1]	High2
Frame Corr	Off	Low	[✓ Mid]	high	
Focus	1	2	3	4	[✓ Broad]
Color Pol	[✓ Normal]	Invert			
Spacial filter	Off	Low	[✓ Mid]	High	
Line density	[✓ Low]	High			
Application	[✓ Abdomen]	Cardio			

Dop Control (kidneys)

	Initialize		Program		
Vel.Range		[✓ 2KHZ]	4KHZ	6KHZ	8KHZ
Filter	[✓ 50HZ]	100Hz	200HZ	400HZ	800HZ
Sample Vol	[✓ 1mm]	2mm	3mm	5mm	10mm
Pre Comp	low	mid1	mid2	[✓ high]	
Reject	(00/14)				
Base Line	low	midl	[✓ cent]	midh	high
Invert	[✓ norm]	invert.			
Unit	m/s	[✓ cm/s]	KHZ		

Flow Control (kidneys)

			Program		
Color disp	V/Var1	V/Var2	Var	V-Enh1	[✓ V-Enh2]
Vel Range	0.5KHZ	[✓ 1KHZ]	2KHZ	4KHZ	6KHZ
Filter	Low	[✓ Mid1]	Mid2	High	
Col Avrg	Low	[✓ Mid]	High	Hori	
Col Rej	(00,32)				
Disp Area	Wide	Mid1	[✓ Mid2]	Narr	
Area Lock	Off	On			
Color edge	[✓ Color-cut (25-63)]		[✓ White-cut (25-63)]		
Flow Enh	Low 2	Low1	STD	High1	[✓ High2]
Frame Corr	Off	Low	[✓ Mid]	high	
Focus	1	2	3	4	[✓ Broad]
Color Pol	[✓ Normal]	Invert			
Spacial filter	Off	[✓ Low]	Mid	High	
Line density	[✓ Low]	High			
Application	[✓ Abdomen]	Cardio			

Dop Control (aorta)

	Initialize		Program		
Vel.Range		2KHZ	4KHZ	[✓ 6KHZ]	8KHZ
Filter	50HZ	[✓ 100Hz]	200HZ	400HZ	800HZ
Sample Vol	1mm	2mm	3mm	[✓ 5mm]	10mm
Pre Comp	low	mid1	mid2	[✓ high]	
Reject	(00/14)				
Base Line	low	midl	[✓ cent]	midh	high
Invert	[✓ norm]	invert.			
Unit	m/s	[✓ cm/s]	KHZ		

Flow Control (aorta)

			Program		
Color disp	V/Var1	V/Var2	Var	V-Enh1	[✓ V-Enh2]
Vel Range	0.5KHZ	1KHZ	2KHZ	4KHZ	[✓ 6KHZ]
Filter	Low	Mid1	[✓ Mid2]	High	
Col Avrg	Low	Mid	High	[✓ Hori]	
Col Rej	(00,32)				
Disp Area	Wide	Mid1	[✓ Mid2]	Narr	
Area Lock	Off	[✓ On]			
Color edge	[✓ Color-cut] (25-63)		[✓ White-cut] (25-63)		
Flow Enh	Low 2	Low1	STD	[✓ High1]	High2
Frame Corr	Off	Low	[✓ Mid]	high	
Focus	1	2	3	4	[✓ Broad]
Color Pol	[✓ Normal]	Invert			
Spacial filter	Off	Low	Mid	[✓ High]	
Line density	[✓ Low]	High			
Application	[✓ Abdomen]	Cardio			

Dop Control (fetal heart)

	Initialize		Program		
Vel.Range		2KHZ	4KHZ	[✓ 6KHZ]	8KHZ
Filter	50HZ	100Hz	200HZ	400HZ	800HZ
Sample Vol	1mm	2mm	[✓ 3mm]	5mm	10mm
Pre Comp	low	mid1	mid2	[✓ high]	
Reject	(00/14)				
Base Line	low	midl	[✓ cent]	midh	high
Invert	[✓ norm]	invert.			
Unit	m/s	[✓ cm/s]	KHZ		

Flow Control (fetal heart)

			Program		
Color disp	[✓ V/Var1]	V/Var2	Var	V-Enh1	V-Enh2
Vel Range	0.5KHZ	1KHZ	2KHZ	4KHZ	[✓ 6KHZ]
Filter	Low	Mid1	Mid2	[✓ High]	
Col Avrg	Low	Mid	High	[✓ Hori]	
Col Rej	(00,32)				
Disp Area	Wide	Mid1	Mid2	[✓ Narr]	
Area Lock	Off	[✓ On]			
Color edge	[✓ Color-cut]	(25-63)	[✓ White-cut]	(25-63)	
Flow Enh	Low 2	Low1	[✓ STD]	High1	High2
Frame Corr	Off	[✓ Low]	Mid	high	
Focus	1	2	[✓ 3]	[✓ 4]	Broad
Color Pol	[✓ Normal]	Invert			
Spacial filter	Off	Low	Mid		[✓ High]
Line density	[✓ Low]	High			
Application	Abdomen	[✓ Cardio]			

Dop Control (thyroid)

	Initialize		Program		
Vel.Range		[✓ 2KHZ]	4KHZ	6KHZ	8KHZ
Filter	[✓ 50HZ]	100Hz	200HZ	400HZ	800HZ
Sample Vol	[✓ 1mm]	2mm	3mm	5mm	10mm
Pre Comp	low	mid1	mid2	[✓ high]	
Reject	(00/14)				
Base Line	low	midl	[✓ cent]	midh	high
Invert	[✓ norm]	invert.			
Unit	m/s	[✓ cm/s]	KHZ		

Flow Control (thyroid)

			Program		
Color disp	V/Var1	V/Var2	Var	V-Enh1	[✓ V-Enh2]
Vel Range	[✓ 0.5KHZ]	1KHZ	2KHZ	4KHZ	6KHZ
Filter	Low	[✓ Mid1]	Mid2	High	
Col Avrg	[✓ Low]	Mid	High	Hori	
Col Rej	(00,32)				
Disp Area	Wide	Mid1	[✓ Mid2]	Narr	
Area Lock	Off	[✓ On]			
Color edge	[✓ Color-cut] (25-63)		[✓ White-cut] (25-63)		
Flow Enh	Low 2	Low1	STD	High1	[✓ High2]
Frame Corr	Off	Low	[✓ Mid]	high	
Focus	1	[✓ 2]	3	4	Broad
Color Pol	[✓ Normal]	Invert			
Spacial filter	[✓ Off]	Low	Mid	High	
Line density	Low	[✓ High]			
Application	[✓ Abdomen]	Cardio			

Dop Control (fetal heart)

	Initialize		Program		
Vel.Range		2KHZ	4KHZ	[✓ 6KHZ]	8KHZ
Filter	50HZ	100Hz	200HZ	400HZ	800HZ
Sample Vol	1mm	2mm	[✓ 3mm]	5mm	10mm
Pre Comp	low	mid1	mid2	[✓ high]	
Reject	(00/14)				
Base Line	low	midl	[✓ cent]	midh	high
Invert	[✓ norm]	invert.			
Unit	m/s	[✓ cm/s]	KHZ		

Flow Control (fetal heart)

			Program		
Color disp	[✓ V/Var1]	V/Var2	Var	V-Enh1	V-Enh2
Vel Range	0.5KHZ	1KHZ	2KHZ	4KHZ	[✓ 6KHZ]
Filter	Low	Mid1	Mid2	[✓ High]	
Col Avrg	Low	Mid	High	[✓ Hori]	
Col Rej	(00,32)				
Disp Area	Wide	Mid1	Mid2	[✓ Narr]	
Area Lock	Off	[✓ On]			
Color edge	[✓ Color-cut]	(25-63)	[✓ White-cut]		(25-63)
Flow Enh	Low 2	Low1	[✓ STD]	High1	High2
Frame Corr	Off	[✓ Low]	Mid	high	
Focus	1	2	[✓ 3]	[✓ 4]	Broad
Color Pol	[✓ Normal]	Invert			
Spacial filter	Off	Low	Mid	[✓ High]	
Line density	[✓ Low]	High			
Application	Abdomen	[✓ Cardio]			

Dop Control (large vessel, high flow)

	Initialize		Program		
Vel.Range		2KHZ	4KHZ	[✓ 6KHZ]	8KHZ
Filter	50HZ	[✓ 100Hz]	200HZ	400HZ	800HZ
Sample Vol	1mm	2mm	[✓ 3mm]	5mm	10mm
Pre Comp	low	mid1	mid2	[✓ high]	
Reject	(00/14)				
Base Line	low	midl	[✓ cent]	midh	high
Invert	[✓ norm]	invert.			
Unit	m/s	[✓ cm/s]	KHZ		

Flow Control (large vessel, high flow)

			Program		
Color disp	V/Var1	V/Var2	Var	V-Enh1	[✓ V-Enh2]
Vel Range	0.5KHZ	1KHZ	2KHZ	4KHZ	[✓ 6KHZ]
Filter	Low	[✓ Mid1]	Mid2	High	
Col Avrg	Low	Mid	High	[✓ Hori]	
Col Rej	(00,32)				
Disp Area	Wide	[✓ Mid1]	Mid2	Narr	
Area Lock	Off	[✓ On]			
Color edge	[✓ Color-cut] (25-63)		[✓ White-cut] (25-63)		
Flow Enh	Low 2	Low1	STD	[✓ High1]	High2
Frame Corr	Off	Low	[✓ Mid]	high	
Focus	1	2	3	4	[✓ Broad]
Color Pol	[✓ Normal]	Invert			
Spacial filter	Off	Low	Mid	[✓ High]	
Line density	[✓ Low]	High			
Application	[✓ Abdomen]	Cardio			

Dop Control (large vessel, low flow)

	Initialize		Program		
Vel.Range		[✓ 2KHZ]	4KHZ	6KHZ	8KHZ
Filter	[✓ 50HZ]	100Hz	200HZ	400HZ	800HZ
Sample Vol	1mm	2mm	[✓ 3mm]	5mm	10mm
Pre Comp	low	mid1	mid2	[✓ high]	
Reject	(00/14)				
Base Line	low	midl	[✓ cent]	midh	high
Invert	[✓ norm]	invert.			
Unit	m/s	[✓ cm/s]	KHZ		

Flow Control (large vessel, low flow)

			Program		
Color disp	V/Var1	V/Var2	Var	V-Enh1	[✓ V-Enh2]
Vel Range	[✓ 0.5KHZ]	1KHZ	2KHZ	4KHZ	6KHZ
Filter	[✓ Low]	Mid1	Mid2	High	
Col Avrg	[✓ Low]	Mid	High	[✓ Hori]	
Col Rej	(00,32)				
Disp Area	Wide	Mid1	[✓ Mid2]	Narr	
Area Lock	Off	[✓ On]			
Color edge	[✓ Color-cut] (25-63)		[✓ White-cut] (25-63)		
Flow Enh	Low 2	Low1	STD	High1	[✓ High2]
Frame Corr	Off	Low	[✓ Mid]	high	
Focus	1	2	3	4	[✓ Broad]
Color Pol	Normal	Invert			
Spacial filter	Off	Low	Mid	[✓ High]	
Line density	[✓ Low]	High			
Application	Abdomen	Cardio			

Dop Control (small vessel, high flow)

	Initialize		Program		
Vel.Range		2KHZ	[✓ 4KHZ]	6KHZ	8KHZ
Filter	50HZ	[✓ 100Hz]	200HZ	400HZ	800HZ
Sample Vol	[✓ 1mm]	2mm	3mm	5mm	10mm
Pre Comp	low	mid1	mid2	[✓ high]	
Reject	(00/14)				
Base Line	low	midl	[✓ cent]	midh	high
Invert	[✓ norm]	invert.			
Unit	m/s	[✓ cm/s]	KHZ		

Flow Control (small vessel, high flow)

			Program		
Color disp	V/Var1	V/Var2	Var	V-Enh1	[✓ V-Enh2]
Vel Range	0.5KHZ	[✓ 1KHZ]	2KHZ	4KHZ	6KHZ
Filter	Low	[✓ Mid1]	Mid2	High	
Col Avrg	[✓ Low]	Mid	High	Hori	
Col Rej	(00,32)				
Disp Area	Wide	Mid1	Mid2	[✓ Narr]	
Area Lock	Off	On			
Color edge	[✓ Color-cut] (25-63)			[✓ White-cut] (25-63)	
Flow Enh	Low 2	Low1	STD	[✓ High1]	High2
Frame Corr	Off	Low	[✓ Mid]	high	
Focus	1	2	3	4	[✓ Broad]
Color Pol	[✓ Normal]	Invert			
Spacial filter	[✓ Off]	Low	Mid	High	
Line density	Low	[✓ High]			
Application	[✓ Abdomen]	Cardio			

Dop Control (small vessel, low flow)

	Initialize		Program		
Vel.Range		[✓ 2KHZ]	4KHZ	6KHZ	8KHZ
Filter	[✓ 50HZ]	100Hz	200HZ	400HZ	800HZ
Sample Vol	[✓ 1mm]	2mm	3mm	5mm	10mm
Pre Comp	low	mid1	mid2	[✓ high]	
Reject	(00/14)				
Base Line	low	midl	[✓ cent]	midh	high
Invert	[✓ norm]	invert.			
Unit	m/s	[✓ cm/s]	KHZ		

Flow Control (small vessel, low flow)

			Program		
Color disp	V/Var1	V/Var2	Var	V-Enh1	[✓ V-Enh2]
Vel Range	[✓ 0.5KHZ]	1KHZ	2KHZ	4KHZ	6KHZ
Filter	[✓ Low]	Mid1	Mid2	High	
Col Avrg	[✓ Low]	Mid	High	Hori	
Col Rej	(00,32)				
Disp Area	Wide	Mid1	Mid2	[✓ Narr]	
Area Lock	Off	[✓ On]			
Color edge	[✓ Color-cut] (25-63)			[✓ White-cut] (25-63)	
Flow Enh	Low 2	Low1	STD	High1	[✓ High2]
Frame Corr	Off	Low	[✓ Mid]	high	
Focus	1	2	3	4	[✓ Broad]
Color Pol	[✓ Normal]	Invert			
Spacial filter	[✓ Off]	Low	Mid	High	
Line density	Low	[✓ High]			
Application	[✓ Abdomen]	Cardio			

Aloka

SERVICE MANUAL

ECHO CAMERA

SSD - 680EX / SSD - 680STD

2 / 2

English Edition

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Section 6 PCB Block Diagram

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Section 8 Trouble Shooting

9 - 1 General

Adjusters shown in this section are used for direct adjustment of ultrasonic image it self.

9 - 2 Precautions

In order to prevent occurrence of secondary trouble incidental to mis-adjustment, every work according to the adjustment procedure described below should be performed only by highly educated and skilled persons who have attended a training course approved by ALOKA.
When performing actual adjustment work, give care to the following points:

(1) Do not start working hastily soon after turning on the power switch , but wait for a time until the equipment warms up satisfactory.

(2) When adjusting variable resistor s, take care not to exert undue force on PCBs.

(3) With advance in S.M.T. (Surface Mount Technology), some variable resistors actually mounted may be size smaller than before. When adjusting those small variable resisters,be sure to use screwdrivers well fitting in with those resisters.

(4) Never temper with any variable resistors or variable inductance other than variable resistors specified in this section. Careless tempering with may result in a state hard to restore the normal condition .

9 - 3 Tolls and Measurers

The prepared tools and measures are following

1. Oscilloscope
   Sensitivity : 5mV/div
   Frequency width : DC~50MHz
   Input voltage : more than 400V

2. Digital Volt mater
   Range : ACV, DC, DCA, Ω

3. Probe
   Convex : UST-959-3.5

4. Screw driner For +M3 screw
   For adjustment screw driver

5. Extension board : EP-2351

9 - 4 Adjustment

All of the adjustment should be done with Convex probe "UST-959-3.5".

° EP-3265*-3 MAIN CONTROL

To make setting of the GAIN knob and indication on the TV monitor appropriate.
For adjustment, Menu "CHARACTER DISP" is ON

° EP-3265*-3 MAIN CONTROL

To set the echo erase of echo erase limit to an appropriate value.
For adjustment, "Measurement Function × " is ON.

º EP-3463* VBPF & GAIN CONTROL

To make the continuity smooth in depth direction of ultrasound image.

° EP-3459* Rx FOCUS

To make the continuity smooth in depth direction of ultrasound image.

° EP-3463* VBPF & GAIN CONTROL

To perform internal adjustment of GAIN and STC so that the acting range of the GAIN and STC knobs on the panel can be calibrated.

° EP-3463* VBPF & GAIN CONTROL

To perform internal adjustment of GAIN and STC so that the acting range of the GAIN and STC knobs on the panel can be calibrated.

° EP-3461*-* MAIN AMP & COLOR ITF

To set the noise level of ultrasound image to an appropriate value.

° EP-3461*-* MAIN AMP & COLOR ITF

To set the base level of FTC to an appropriate value.

° EP-3463* VBPF & GAIN CONTROL

To minimize the change of actual echo in the monochrome picture when B-mode Flow is ON.

° EP-2729* A/D D/A

To set the REC VIDEO and CAMERA B/W VIDEO to an appropriate level.

° EP-3443* VIDEO I.T.F.

To set the out put signal from the external out put terminal to an appropriate level

9-4-1 EP-3265*-* MAIN CONTROL

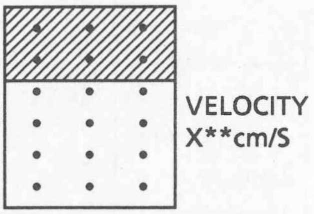
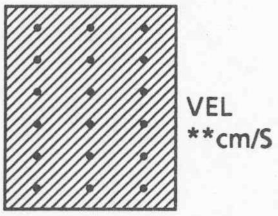
Purpose of Adjustment

To make setting of the GAIN knob and indication on the TV monitor appropriate.
For adjustment, Menu "CHARACTER DISP" is ON.

Item	Condition	Adjust.	Test point	Standard
FLOW-GAIN display	MODE : B/FLOW FLOW-GAIN : 10	RV1	TP7	0V +0.2 -0 V
FLOW-GAIN display	MODE : B/FLOW FLOW-GAIN : 0	RV4	TP7	9.5V +0.2 -0 V
B-GAIN	MODE : B B-GAIN : 10	RV2	On TV monitor	Parameter display : G90
B-GAIN	MODE : B B-GAIN : 0	RV5	On TV monitor	Parameter display : G30

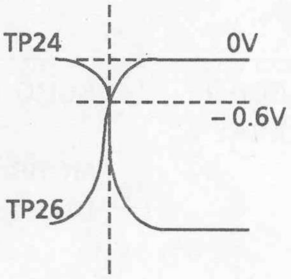
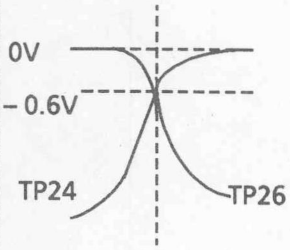
9-4-2 EP-3265*-* MAIN CONTROL

Purpose of Adjustment	To set the echo erase of echo erase limit to an appropriate value. For adjustment, Menu "Measurement Function ×" is ON.

Item	Condition	Adjust.	Test point	Standard
ECHO ERASE	ECHO ERASE : 10 MODE : M DIAGNOSTIC TRACKBALL FUNCTION : Press ×	RV3	On TV monitor	 Erosion of M mode image must reach to upper edge of letters VELOCITY.
ECHO ERASE	ECHO ERASE : 0 MODE : M DIAGNOSTIC	RV6	On TV monitor	 M-mode image must remain unerased at bottom of screen.

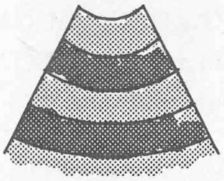
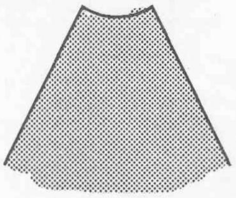
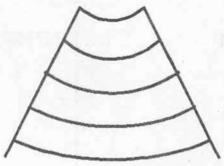
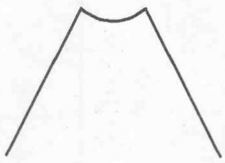
9-4-3 EP-3463* VBPF & GAIN CONTROL

Purpose of Adjustment	To make the continuity smooth in depth direction of ultrasound image.

Item	Condition	Adjust.	Test point	Standard
Making continuity in depth direction of image smooth	MODE : B	RV21	Observe TP24 and TP26 with an oscilloscope set to 2-channel, CHOP mode. Set trigger of oscilloscope at leading edge ↑ of TP26.	– 0.6V point of falling edge ↓ of TP24 must coincide in time with – 0.6V point of leading edge ↑ of TP26 
	MODE : B	RV22	Observe TP24 and TP26 with an oscilloscope set to 2-channel, CHOP mode. Set trigger of oscilloscope at leading edge ↑ of TP24.	– 0.6V point of fallingedge ↓ of TP26 must coincide in time with – 0.6V point of leading edge ↑ of TP24. 

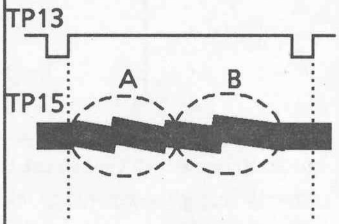
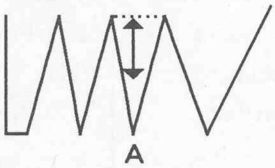
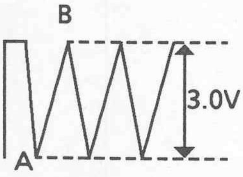
9-4-4 EP-3459* Rx FOCUS

Purpose of Adjustment : To make the continuity smooth in depth direction of ultrasound image.

Item	Condition	Adjust.	Test point	Standard
Equalizing noise level	Probe is left in the air. MODE : B STC : All knobs turned to right fully. CONTRAST : 7 FOCUS : 4 AGC : Min GAIN : Max When the PCB is in an unit, an adjustment screw driver doesn't reach the RV301. Therefore, please repeat the following; You turn RV301, putting out the PCB. You check the ultrasound image picture, conncting the PCB in an unit (do not use an Extension board)	RV301 Two PCBs EP-3459 are uced. correct difference, if any, in brightness between adjacent areas by fine-adustment with RV301 on an EP3459 (one which has been replaced) Prepared for repair. (Match brightness with that of original PCB.) For verification after adjustment, besure to remove extention PCB.	ON TV monitor	 There is difference in sensitiveness between stages. ↓  Even sensitiveness.
Minimizing noise on focus borders.	Probe is left in the air. MODE : B STC : All knobs turned to right fully. CONTRAST : 7 FOCUS : 4 AGC : Min GAIN : Max	RV302 or RV303 With RV302 turned clockwise fully, adjust RV303 to minimize noise on focus borders on ultrasound image picture, or with RV303 turned counterclock-wise fully, adjust RV302 to minimize noise on focus borders on ultrasound image picture.	On TV monitor	 Much noise on borders. ↓  Less noise on borders.

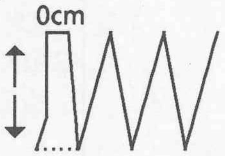
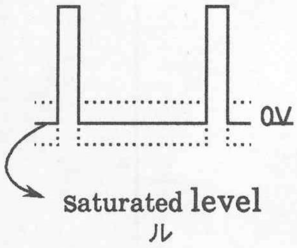
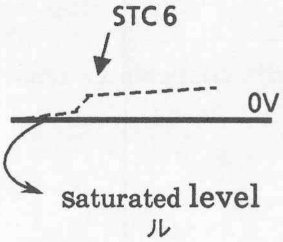
9-4-5 EP-3463* VBPF & GAIN CONTROL

Purpose of Adjustment To perform internal adjustment of GAIN and STC so that the acting range of the GAIN and STC knobs on the panel can be calibrated.

Item	Condition	Adjust.	Test point	Standard
B, M, FLOW GAIN voltage adjustment	B GAIN : 10 M GAIN : 10 FLOW GAIN : 10	RV12	J2 B33pin	+4.00±0.05V
STC VOLTAGE	STC : MAX	RV6	J2 B34pin	+1.00±0.05V
STC DC level	STC : MIN	RV8	TP15	Adjust the DC level of B to be the DC level of A. 
Integral constant	STC 0, 2, 4, 8, 13, 19 : MIN STC 1, 3, 6, 10, 16 : MAX	RV7	TP15	to be level change minimum, when move max to minimum of STC4 (a point) 
STC GAIN	STC 0, 2, 4, 8, 13, 19 : MIN STC 1, 3, 6, 10, 16 : MAX	RV9	TP16	Level difference between STC 1 (point A) and STC 2 (point B) to be 3.0 ± 0.5 Vp-p. 

9-4-6 EP-3463* VBPF & GAIN CONTROL

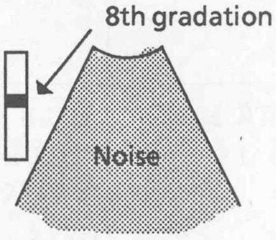
Purpose of Adjustment To perform internal adjustment of GAIN and STC so that the acting range of the GAIN and STC knobs on the panel can be calibrated.

Item	Condition	Adjust	Test point	Standard
STC LEVEL	STC 0, 2, 4, 8, 13, 19 : MIN STC 1, 3, 6, 10, 16 : MAX	RV10	TP16	To be change minimum,when moved max to minimum of STC 0cm 
STC MAX GAIN	STC 0~19 : MAX FOCUS : 4 B-GAIN : 10 RV14 : CW MAX	RV15	TP18	Waveform to be saturated at 0±0.05V 
STC OFFSET	STC 0~4 : MAX 6~19 : set to center FOCUS : 4 B-GAIN : 10	RV14	TP18	Waveform to be saturated at 0 V. 

9-4-7 EP-3461* MAIN AMP & COLOR ITF

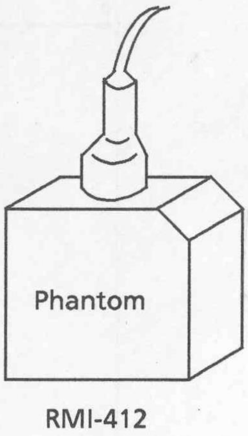
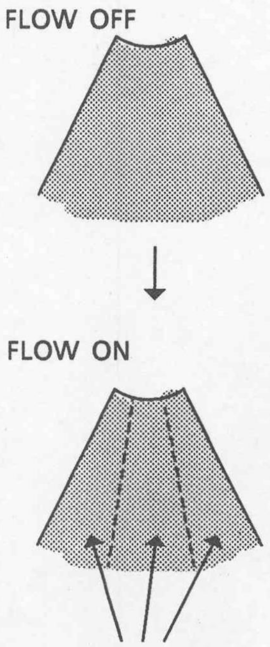
Purpose of Adjustment

To set the noise level of ultrasound image to an appropriate value.

Item	Condition	Adjust.	Test point	Standard
Noise level	MODE : B FOCUS : 4 CONT : 1 STC : MAX GAIN : MAX	RV3	On Tv monitor	With menu PST PRO, SLOPE 2 selected 8th gradation, must become full with noise.  SLOP2

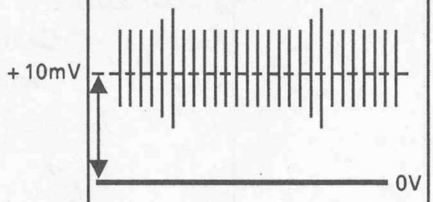
9-4-8 EP-3463* V.B.P.F. & GAIN CONTROL

Purpose of Adjustment To minimize the change of actual echo in the B/W image when B-mode Flow is ON.

Item	Condition	Adjust.	Test point	Standard
B/W image	MODE : B FOCUS : B CONT : 4 FLOW :OFF→ON FLOW GAIN : 0 GAIN : Center STC : Center 	RV16	On TV monitor	When probe is put on against RMI- 412 phantom and FLOW is turned to ON, actual echo brightness on B/W imagemonochrome picture must remain unvaried, compared with FLOW OFF.  B/W image must remain unvaried, compared with FLOW OFF.

9-4-9 EP-3461* MAIN AMP & COLOR ITF

Purpose of Adjustment To set the base level of FTC to an appropriate value.

Item	Condition	Adjust	Test point	Standard
Base level of FTC	MODE : B STC : MIN GAIN : MIN FOCUS : 4 CONT : 1	RV9	TP11	To be adjust, FTC waveform center of +10mV±10mV3 

9-4-10 EP-3461* MAIN AMP & COLOR ITF

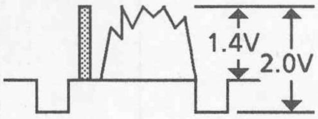
Purpose of Adjustment

To set the base level of COLOR DOPPLER to an appropriate value.

Item	Condition	adjust	Test point	Standard
Base level of COLOR RF SIG	MODE : B FLOW : ON FLOW GAIN :MAX	EP-3461 RV12	EP-5100 TP13	0V ±20mV
Base level of COLOR RF SIG	MODE : B FLOW : ON FLOW GAIN :MAX	EP-3461 RV13	EP-5100 TP14	0V ±20mV

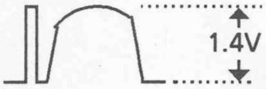
9-4-11 EP-2729* A/D · D/A

Purpose of Adjustment To set the B/W VIDEO to an appropriate level.

Item	Condition	Adjust	Test point	Standard
B/W VIDEO OUT PUT VOLTAGE	MODE : B	RV6 RV7	B/W VIDEO connector on the rear panel.	The temporary adjust RV7 at CCW full up Adjust RV6 amplitude at 2.0±0.05 Vp-p Adjust RV7 to just befor distortion of gray scale bar. 

9-4-12 EP-3443* VIDEO ITF

Purpose of Adjustment: To set the output signal from the external output terminal to an appropriate level.

Item	Condition	Adjust	Test point	Standard
EXT VIDEO COLOR out put voltage	MODE : B FLOW : ON	EP-3443* RV78	Connector EXT VIDEO color at bottom in front of device	Adjust to 1.4V ±0.04 Vp-p 

10-1 Introduction

"Performance Check" describes the items to be confirmed for the maintenance of equipment quality and safety under the circumstances referred to below.

- Once a repair work has been done,
- Once a modification, for a problem or the like, has been made.
- Once a change as to upgrade the functions and/or specifications has been made,
- When a periodic inspection is made.

10-2 Precautions

Unless otherwise specified, this performance check must be conducted with all coverings attached in place and under the following environments:

- 30 minutes or more have passed after throwing the power switch ON.

If the performance check specified herein should be conducted after a repair or modification, make certain of the following:

- All the PCBs removed are reconnected properly.
- All the connectors removed are reconnected properly.
- The replaced ROM and others are mounted in place on a printed circuit board. The power pin, in particular, should never be mistaken for the GND pin.
- The unnecessary ROM is not left behind inside the equipment.
- Tool, measuring probe, and the like are not left behind inside the equipment.
- Optional components and grounding cable are properly reconnected.
- Screws and the like are not left behind inside the equipment.

10-3 Making Entries in Repair Report

Upon completion of the check, enter findings thereof in such a form as repair report or the like. And present it to the user. Keep a copy thereof in custody.

10-4 Performance check

Those items which are covered by a performance check vary, in principle, with what is done for the operation requiring the check. In accordance with the chart given below, identify an item or items required (those marked with ● in the chart). And check each of the items so marked.)

The terms referred to in the chart, meanwhile, are defined, respectively, as follows:

"Power Supply Unit"	Power supply body, isolation transformer, and power switch
"Other units than above"	Units other than the power supply unit, physiological signals and PCBs.

Check Requiring Operation	CHECK ITEM			REMARKS
	Function	Image quality	Safety	
Replacing parts or modification inside power supply unit.	●	●	●	including PCB replacement.
Replacing the power supply unit as a whole.	●	●		
Replacing parts or modification inside physiological signal unit.	●	●	●	including PCB replacement.
Replacing the physiological signal unit as a whole.	●	●		
Replacing a PCB in units other than that the above.	●	●		
Replacing parts or modification on PCB in other units.	●	●		including ROM replacement.
Replacing units other than that referred to above as a whole.	●	●		Including a probe.
Performance check before the modification	●	●		
Periodic inspection	●	●	●	

What be checked in each of the check items, meanwhile, is given on the pages described below, to which you are requested to refer.

Functional Check	Item 10-4-1 from Page 10-4 and on.
Image quality Check	Item 10-4-2 from Page 10-10 and on.
Safety Check	Item 10-4-3 from Page 10-13 and on.

If a specified performance or rating should be found unsatisfied as a result of the check, the equipment should be deemed failed.
Now, refer to Section 8 "Troubleshooting" to dissolve the failure.

10-4-1 Checking for function

Operate the equipment on the operation panel to make certain that the equipment is operating properly subject to each function related with the panel switches.

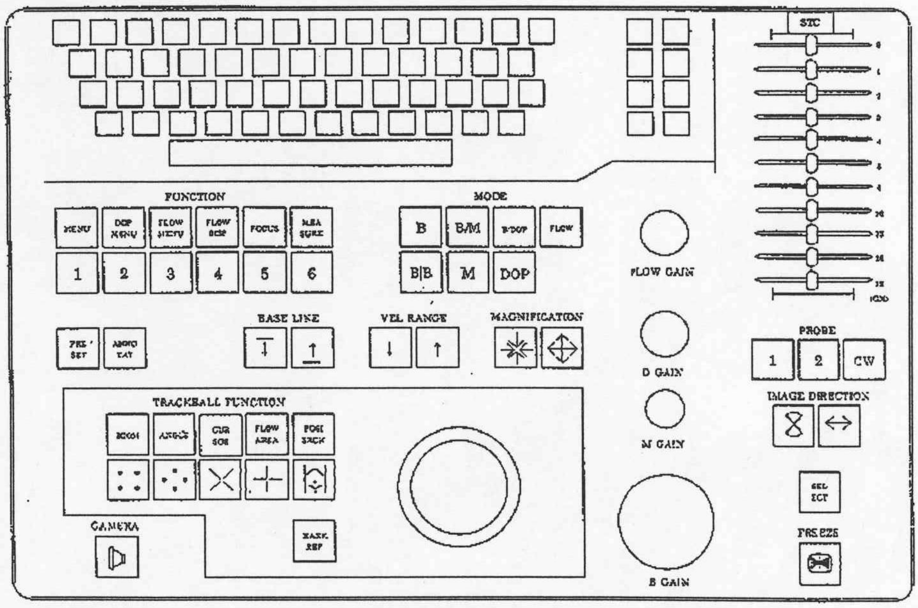
(1) Confirmation items on POWER ON

Setting conditions ···· POWER : ON PROBE 1 : UST-959-3.5

① The power lamp is lit.
② All the fans work normally.
③ The system should be started under the initial setting condition (RESET setting).
④ The set values of items set by the user including HOSPITAL, NAME, DATE or TIME are backed up.

(2) Confirmation of panel switch operation

When the PCB mounted closely to the panel switch is replaced, or a switch mounted on the panel is replaced, make sure to confirm key top conditions. If the key top is deviated, the correct switch operation may not be performed.
An LED is lit while the function equivalent to the switch is selected.
Confirm all the switches shown in the drawing of the panel shown below work correctly.


STC
FUNCTION
MENU
DOP MENU
FOCUS
MEA SURE
1
2
3
4
5
6
MODE
B
B/M
B-DOP
FLOW
B|B
M
DOP
FLOW GAIN
PRE SET
ANNO TAT
BASE LINE
VEL RANGE
MAGNIFICATION
D GAIN
PROBE
1
2
CW
TRACKBALL FUNCTION
ZOOM
ANGLE
CUR SOR
FLOW AREA
M GAIN
IMAGE DIRECTION
SEL ECT
CAMERA
FREEZE
B GAIN

The LEDs on the panel switches provide the following three lighting conditions:

OFF : Does not function even if this switch is pressed.
Lit : The switch is currently selected.
Half lit : Medium brightness. This switch is selectable.

(3) Confirmation of menu contents

Select FUNCTION MENU.
The contents once selected in the MENU are inherited until re-selection of the MENU or forced setting by preset switch is performed, even when setting conditions including mode or MAG are changed. However, some items are not selectable depending on the setting conditions.
Confirm the following items operate correctly.

MENU PAGE

Setting condition ···· Desired page

① The LED is lit when MENU SW is pressed, and the LEDs of switches 1 to 6 are half lit. The following menu is displayed at the lower part of the screen.

IMAGE	1	2	3	4	5	6
CONT1	PREV	PRE PRO	GAMMA	FRO-CO	M-WIN	NEXT

② The menu changes to the following by pressing 6 NEXT.

IMAGE	1	2	3	4	5	6
CONT2	PREV	PST PRO	C-GAMMA			NEXT

③ The menu changes to the following by pressing 6 NEXT.

INDI	1	2	3	4	5	6
CATION	PREV	BDY-MK	PUNC	CH-DSP	ANNOTAT	NEXT

④ The menu changes to the following by pressing 6 NEXT.

SET UP	1	2	3	4	5	6
PREV	HOSP	DATE		TEST		NEXT

⑤ The menu returns to IMAGE CONT1 by pressing 6 NEXT.

⑥ The menu returns to the previous menu by pressing 1 PREV in any menu displayed.

⑦ The LED turns to harf-lit state and the LEDs of switches 1 to 6 are turned off by pressing MENU switch.

(4) Confirmation of Focus

Setting conditions ····MODE:B, 2B
FREEZE:OFF

① The LED of the FOCUS switch is lit upon pressing the switch and the following menu is displayed.

FOCUS	1	2	3	4	5	6
	1	2	3	4	BROAD	MULTI

② Image transmission focuses are independently set by selecting a number or numbers of 1 to 4. (Any combinations are available.)

③ The setting is changed to (MULTI OFF) by pressing 5, and any one of 1 to 4 is set.

④ The setting is returned to (MULTI ON) by pressing 5 again, and the same operation as ② is obtained.

Setting conditions ····MODE:B FLOW, B/M
FREEZE:OFF

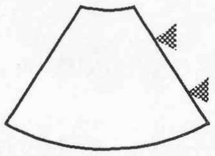
① One image transmission focus only is set by selecting one of the four.

Setting conditions ····MODE:B*/D
FREEZE:OFF

① The focuses can be changed according to the sampling point.

* The automatic display on the screen is also changed according to the setting change.

Example F2, 4 are set. 1 **2** 3 **4** (White against black)



BROAD FOCUS

Setting conditions ····Set FOCUS in PRESET FLOW CONTROL to B (BROAD FOCUS).
BROAD FOCUS is automatically selected in B/FLOW and 2B/FLOW mode. (When doppler function is added, like B/PW+FLOW mode,focus point changes according to the depth of SAMPLE POINT.)

(5) Confirmation of measuring functions

Select MEASURE(NTSC) , MEAS (PAL) in the FUNCTION menu.
The menu shown below is displayed. Input a sample value to the measuring item freely selected and check the measured result.

Setting condition ···· B, 2B

① The LED of the MEASUREMENT switch is lit when the switch is pressed, and the LEDs of switches 1 to 6 are half lit. the menu shown below is displayed at the bottom of the screen.

B-PAGE1	1	2	3	4	5	6
	CLEAR	DIST	AREA-T	OB	%STEN	NEXT

② The menu changes as shown below by pressing 6 NEXT.

B-PAGE2	1	2	3	4	5	6
	CLEAR	VOL	AREA-E	HIST	RATIO	NEXT

③ The menu returns to B-PAGE1 when 6 NEXT is pressed. Thereafter, the menus of ① and ② should be displayed in turn each time 6 NEXT is pressed.

Setting condition ···· B/M

① The LED of the MEASUREMENT switch is lit when the switch is pressed, and the LEDs of switches 1 to 6 are half lit. The menu shown below should be displayed at the bottom of the screen.

M-PAGE1	1	2	3	4	5	6
	CLEAR	DIST	%STEN	RATIO	H-RATE	NEXT

② The menu changes as shown below by pressing 6 NEXT.

M-PAGE2	1	2	3	4	5	6
	CLEAR	POMBO	TEICH			NEXT

③ The menu changes as shown below by pressing 6 NEXT.

B-PAGE1	1	2	3	4	5	6
	CLEAR	DIST	AREA-T	OB	%STEN	NEXT

④ The menu changes as shown below by pressing 6 NEXT.

B-PAGE2	1	2	3	4	5	6
	CLEAR	VOL	AREA-E	HIST	RATIO	NEXT

⑤ The menu should return to M-PAGE1 when 6 NEXT is pressed. Thereafter, menus 1 and 2 should be displayed in turn each time 6 NEXT is pressed.

Setting condition ···· M

① The LED of the MEASUREMENT switch is lit when the switch is pressed, and the LEDs of switches 1 to 6 are half lit. The menu shown below should be displayed at the bottom of the screen.

M-PAGE1	1	2	3	4	5	6
	CLEAR	DIST	%STEN	RATIO	H-RATE	NEXT

② The menu changes as shown below by pressing 6 NEXT.

M-PAGE2	1	2	3	4	5	6
	CLEAR	POMBO	TEICH			NEXT

③ The menu should return to M-PAGE1 when 6 NEXT is pressed. Thereafter, the menus of ① and ② should be displayed in turn each time 6 NEXT is pressed.

Setting condition ···· B/DOP

① The LED of the MEASUREMENT switch is lit when the switch is pressed, and the LEDs of switches 1 to 6 are half lit. The menu shown below should be displayed at the bottom of the screen.

D-PAGE1	1	2	3	4	5	6
	CLEAR	VEL	F-VOL	PUL-IND	P-GRAD	NEXT

② The menu changes as shown below by pressing 6 NEXT.

D-PAGE2	1	2	3	4	5	6
	CLEAR	POU-IND	AVERG	ACCEL	RATIO	NEXT

③ The menu changes as shown below by pressing 6 NEXT.

B-PAGE1	1	2	3	4	5	6
	CLEAR	DIST	AREA-T	OB	%STEN	NEXT

④ The menu changes as shown below by pressing 6 NEXT.

B-PAGE2	1	2	3	4	5	6
	CLEAR	VOL	AREA-E	HIST	RATIO	NEXT

⑤ The menu should return to D-PAGE1 when 6 NEXT is pressed. Thereafter, menus ① to ④ should be displayed in turn each time 6 NEXT is pressed.

Setting condition ···· DOP

① The LED of the MEASUREMENT switch is lit when the switch is pressed, and the LEDs of switches 1 to 6 are half lit. the menu shown below should be displayed at the bottom of the screen.

D-PAGE1	1	2	3	4	5	6
	CLEAR	VEL	F-VOL	PUL-IND	P-GRAD	NEXT

② The menu changes to the following by pressing 6 NEXT.

D-PAGE2	1	2	3	4	5	6
	CLEAR	POU-IND	AVERG	ACCEL	RATIO	NEXT

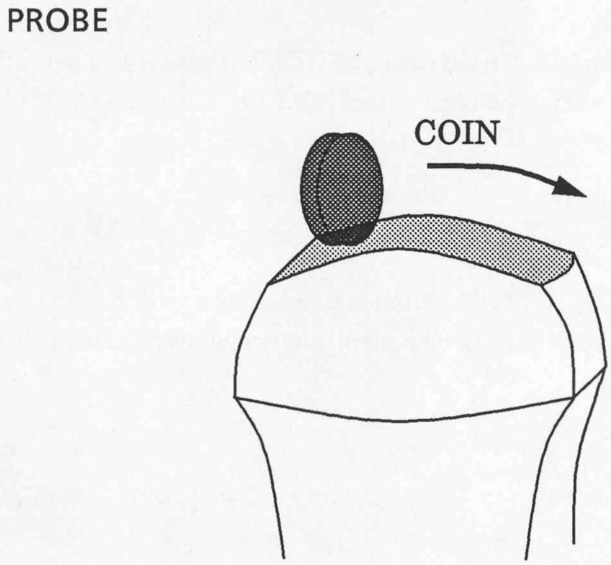
③ The menu should return to D-PAGE1 when 6 NEXT is pressed. Thereafter, the menus of ① and ② should be displayed in turn every time 6 NEXT is pressed.

10-4-2 Checking for image quality

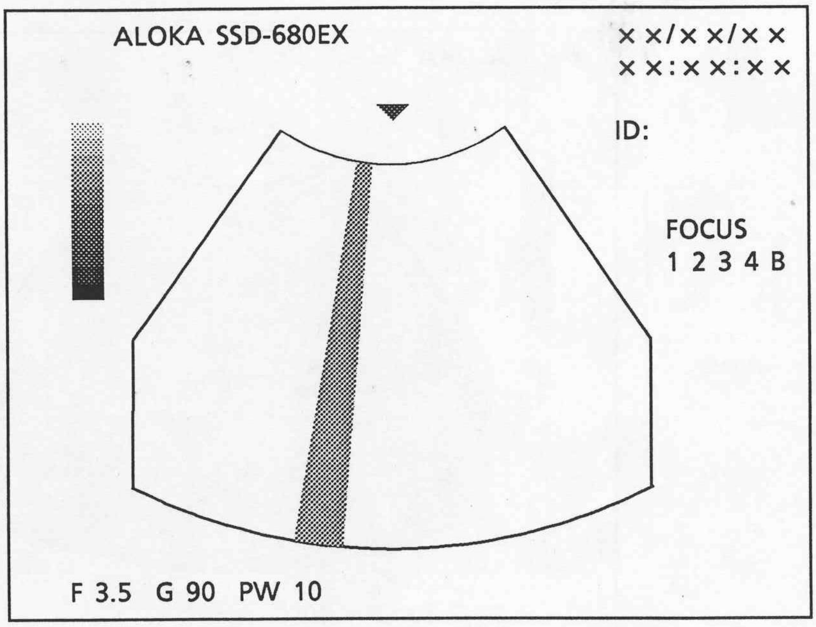
To make certain of an ultrasound image quality, make a checkout by the use of a test piece.

(1) Confirmation of echoing

[Condition]	MODE: B FOCUS: 1
[Procedure]	Apply a small quantity of ultrasound gel to the probe surface . Slide a coin on the surface of the probe slowly with the coin touched to the probe.
[Confirmation]	Observe the image on the TV monitor and check if there is any missing echo, skipping or extreme difference in sensitivity. Also, confirm that the echo generation is changed by changing the FOCUS setting.
[Caution]	Be careful to handle the probe, as the surface of it is easily damaged.



TV MONITOR



(7) Confirmation of total sensitivity

[Condition]	PROBE	:	UST-959-3.5
	MODE	:	B
	FOCUS	:	MULTI All of 1, 2, 3, and 4 ON
	GAIN	:	Max.
	STC	:	All Max.
	ACOUSTIC POWER	:	10

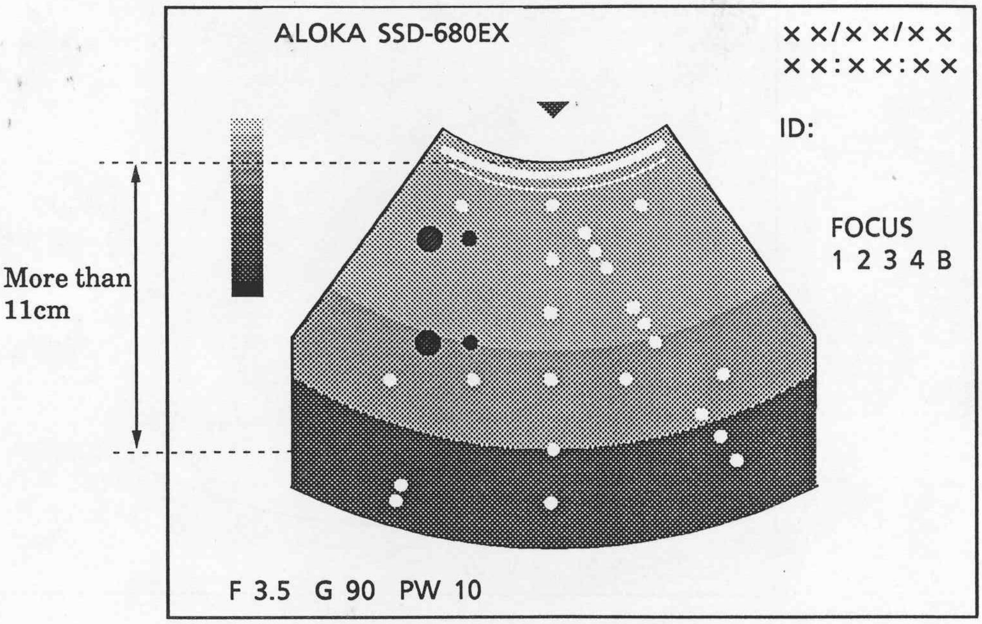
[Procedure] Touch the probe with the phantom.

Phantom : Supplied by Radiation Measurements INC.

MODEL : RMI - 412

[Confirmation] The reflected echo of the seventh target in the depth direction should be confirmed on the ultrasonic image.

Actual echo of 11 cm or longer should be observed.


ALOKA SSD-680EX
××/××/××
××:××:××
ID:
FOCUS
1 2 3 4 B
More than
11cm
F 3.5 G 90 PW 10

10-4-3 Checking for Safety

Every confirmation item shown herein is intended to make certain of the protection performance relative to an insulation of the equipment and to an electric shock suffered by the subject (patient).

(1) Provisions

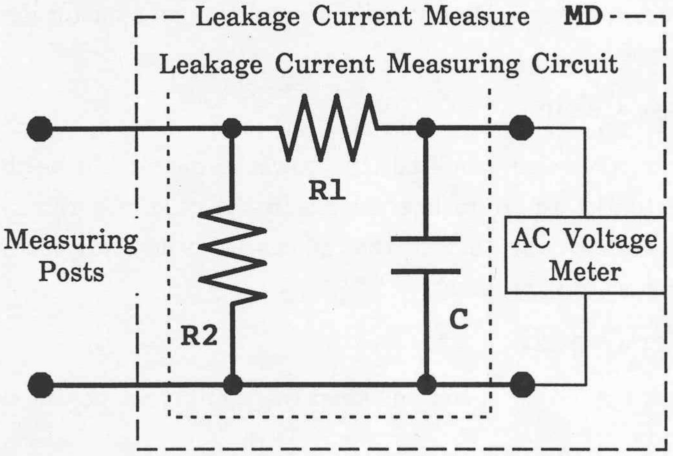
The provisions required for the check are as enumerated below. Provide them in advance.

(a) Digital Multi-meter
A meter, which has a resistance or a continuity test function, and is capable of determining an AC voltage of up to 1 mV.

(b) Megger
A tester capable of determining a test (applied) voltage of up to 100 MΩ at 500 VDC.

(c) Leakage Current Measuring Instrument
A measuring instrument capable of determining a leakage current from a medical electric appliance, or a combination of Leakage Current Measuring Circuit (d) below with Digital Multi-meter (a) above.

(d) Leakage Current Measuring Circuit
A circuit is illustrated below.



R1 : 10kΩ±5%
R2 : 1kΩ±1%
C : 0.015μF±5%

(e) Metal Foil
This foil is to be used to determine a patient leakage current at the probe. An area enough to cover the surface of a probe is required.

(f) Weight
500g×2 pieces

- The description below is given with (a) thru (e) used as the names of the provisions referred to above.

- A meter or measuring device may be separated into two or more components as long as each of them satisfies the specifications (standards) shown, respectively.
- Each of the measuring devices and circuits requires a calibration once a year. Besides, keep the calibration records in custody.

(2) Precautions

(2)-1 Environments

To make a check, set up the same goods or environments as those which the user are normally using in terms of the following

- Power and grounding cable, and method of interconnecting them,
- Probe and scanner,
- Cables and optional features, among others, required for diagnosis.

(2)-2 Handling a Measuring Device, etc.

Before putting a measuring device or a measuring circuit into operation, make certain of their respective usage and of the precautions to be taken during the operation.

(2)-3 Calibration

Any measuring device or leakage current measuring circuit that may have had a calibration period expired is prohibited from being used to conduct a check. Do not fail to employ a measuring device properly calibrated.

(2)-4 Power Cable

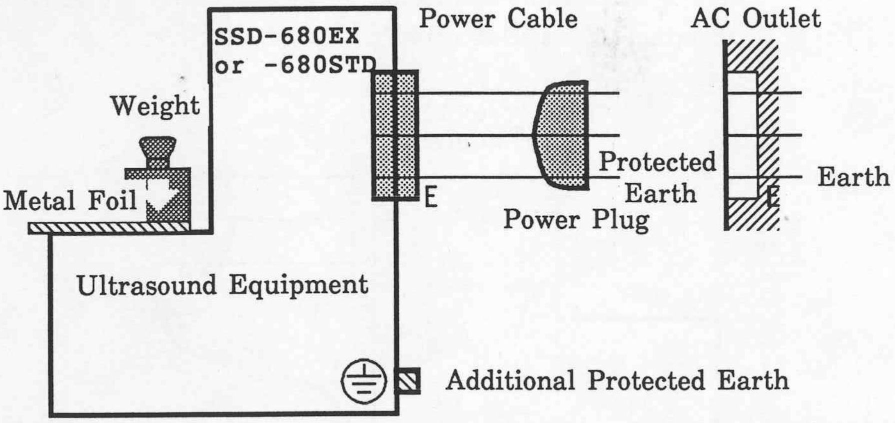
Unless otherwise specified, the power cable should be unplugged out of a power outlet to do an operation. In the case of a removable power cable, meanwhile, make certain that it has been normally connected to the equipment on the body.

(2)-5 Power Switch

Unless otherwise specified, keep the equipment power switch at the OFF position.

(2)-6 Connection Diagram

A connection diagram is given below for the check in which a measuring device is to be employed. The diagram, meanwhile, is expressed in a common format, which has meanings as follows.


SSD-680EX
or -680STD
Power Cable
AC Outlet
Weight
Metal Foil
Protected Earth
Power Plug
Earth
E
Ultrasound Equipment
Additional Protected Earth

(3) Appearance Inspection

Check the equipment enclosure to make certain that it is free from a remarkable concave or distortion.

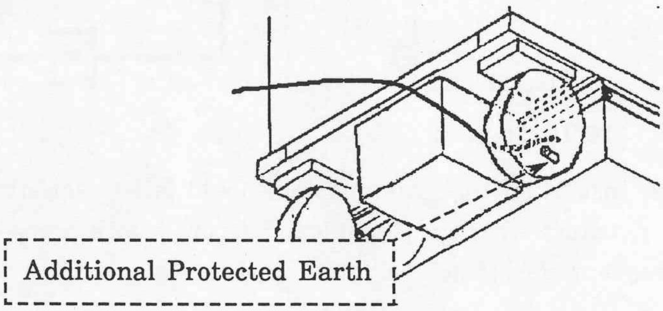
- If the enclosure should have a concave or a distortion, observe it in the interior and make certain that any metal part does not come in abnormal contact.

▸ If the metal should be in abnormal contact, discontinue checking subsequent hereto and dissolve the problem involved.

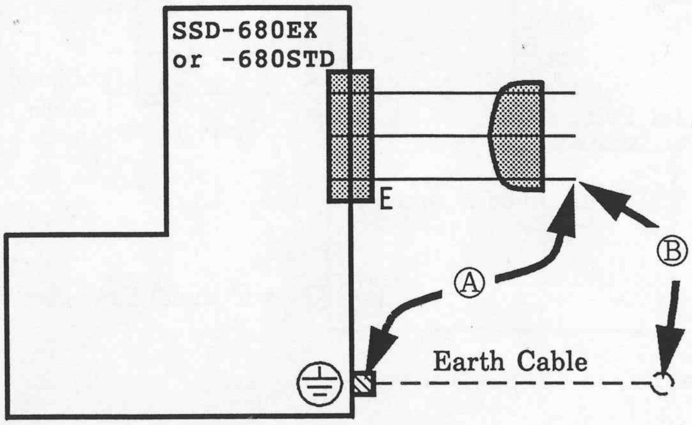
(4) Checking Protected Earth Cable for Continuity

According as the equipment is installed, use a digital multi-meter to make certain that the protected earth cable is electrically connected. Nevertheless, it is necessary to make certain that every cable exisiting in the system which must be checked for continuity is tensioned properly enough not to invite a disconnection of cable.

- In case where the equipment is grounded through the power cable: Between power cable plug earth pin and the additional protected earth terminal on the equipment body (Ⓐ as illustrated)


Additional Protected Earth

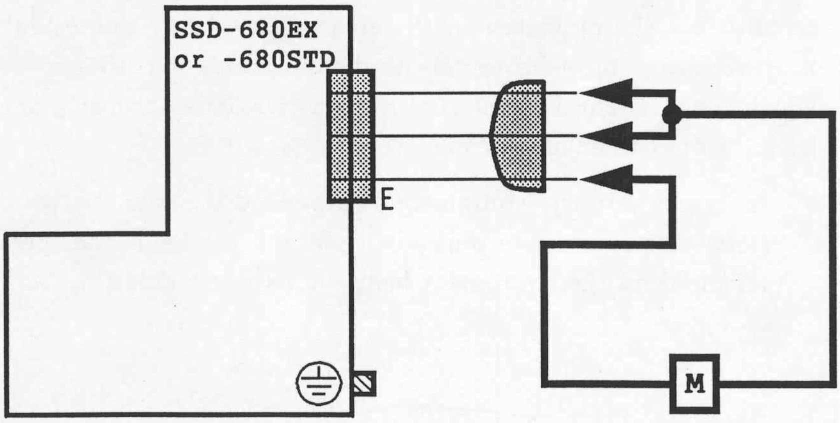
- In case where the equipment is grounded through the earth cable: Between earth pin on the plug side of the power cable and the other end of the earth cable connected to the additional protected grounding terminal (Ⓑ as illustrated)



- ▶ If you cannot check the protected earth cable for continuity, discontinue testing subsequent hereto and dissolve the related problem.

(5) Measuring an Insulation Resistance

As illustrated below, employ a megger to determine the insulation resistance between the power input line and the protected earth cable. "M" in the illustration, moreover, relates to a megger.



Rating : 10MΩ or more

- ▶ If the insulation resistance tester should fail to satisfy the standards, make contact with our Technical Support before proceeding to a subsequent checkout.

(6) Leakage Current

Use the digital multi-meter and the leakage current measuring circuit to determine the values of "Earth leakage current", "Enclosure leakage current" and "Patient leakage current."

All the leakage currents are to be determined, with the power switch ON.

When the leakage current measuring circuit shown on page 10-× is in use, the relation between the indication of AC Volt meter and leakage current is as follow,

(Leakage Current) = (Indication of AC Volt meter) ÷ 1000

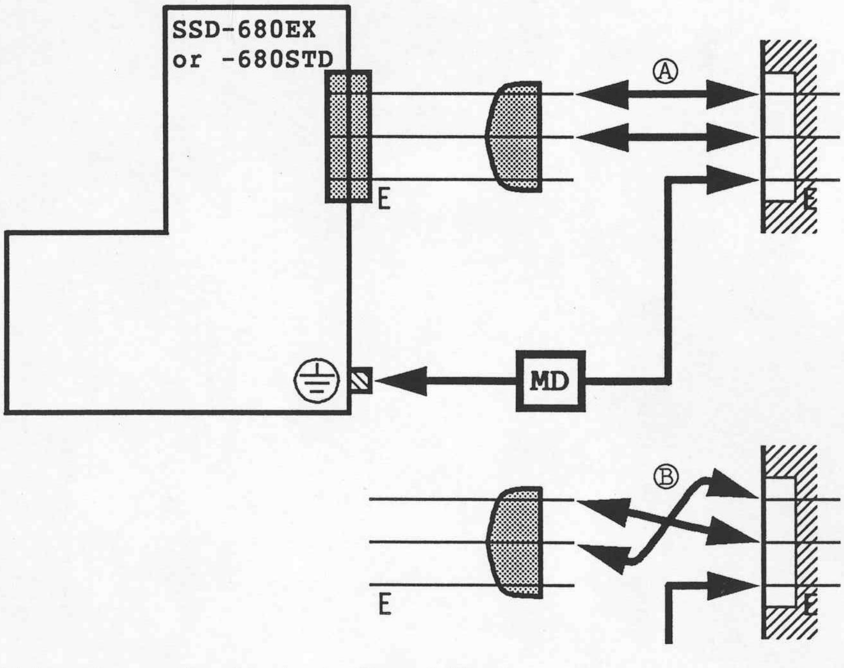
Accordingly, if the AC Volt meter shows 1mV, the leakage current must be 0.001mA.

If the ultrasound diagnostic equipment has an earth with the earth cable attached to the additional protected earth terminal, remove this earth cable before following checks.

(6)-1 Earth leakage current

① Normal conditions

Referring to the illustration given below, connect a measured unit with a leakage current measuring device (MD).

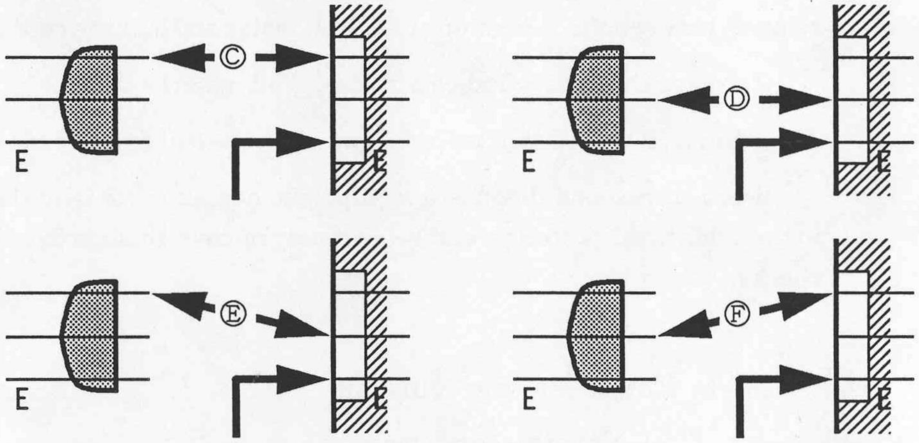


Using Connection Methods Ⓐ and Ⓑ, determine their respective leakage currents. And take the higher one for the value under the "Normal conditions".

Rating : Not to exceed 0.5mA

② Single Fault Condition

Based on Normal Connection Method ①, determine the leakage current at each of Connections Ⓒ thru Ⓕ. And take the highest leakage current for the "Single Fault Condition".



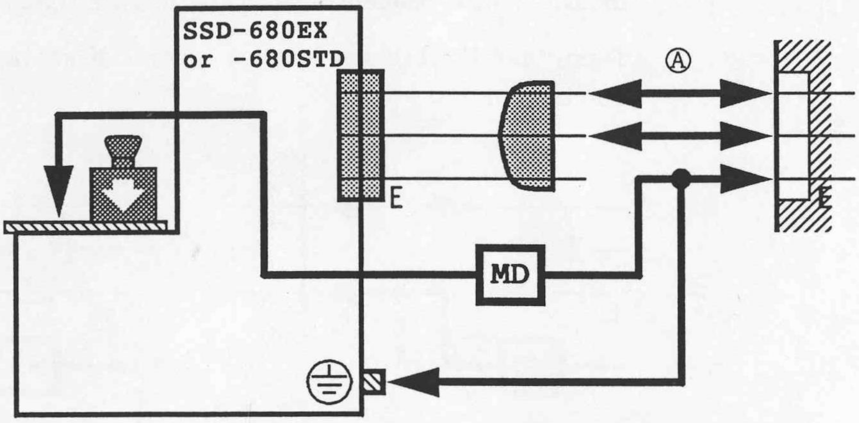
Rating : Not to exceed 1mA

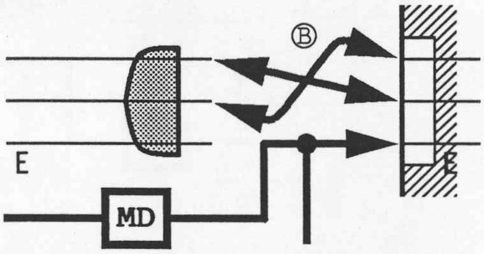
(6)-2 Enclosure leakage current (a)
(Between the enclosure and the earth)

① Normal conditions

Referring to the illustration given below, connect a measured unit with a leakage current measuring device (MD).

With the metal foil (10 cm × 20 cm) placed on the enclosure, put a weight thereon. Then, connect the leakage current measuring device (MD) between the metal foil piece and the earth.





Using Connection Methods Ⓐ and Ⓑ, determine their respective leakage currents. And take the higher one for the value under the "Normal conditions".

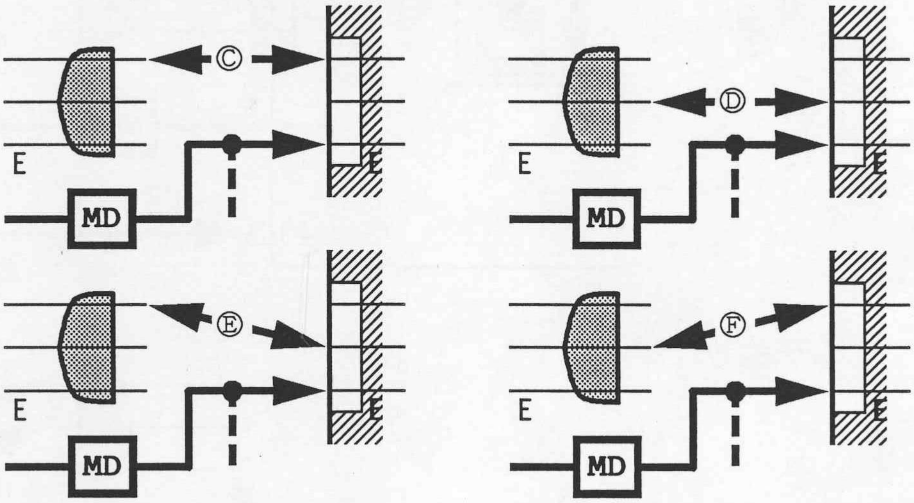
Rating : Not to exceed 0.1 mA

② Single Fault Condition

Measure the leakage current without grounding based on Ⓐ and Ⓑ of Normal Connection Method ①.

Furthermore, based on Normal Connection Method ①, determine the leakage current at each of Connections Ⓒ thru Ⓕ. In each connection, moreover, determine the leakage currents, respectively in the two cases where the equipment is and is not grounded (as indicated with broken lines in the illustration).

Then, take the highest leakage current of above for the "Single Fault Condition".

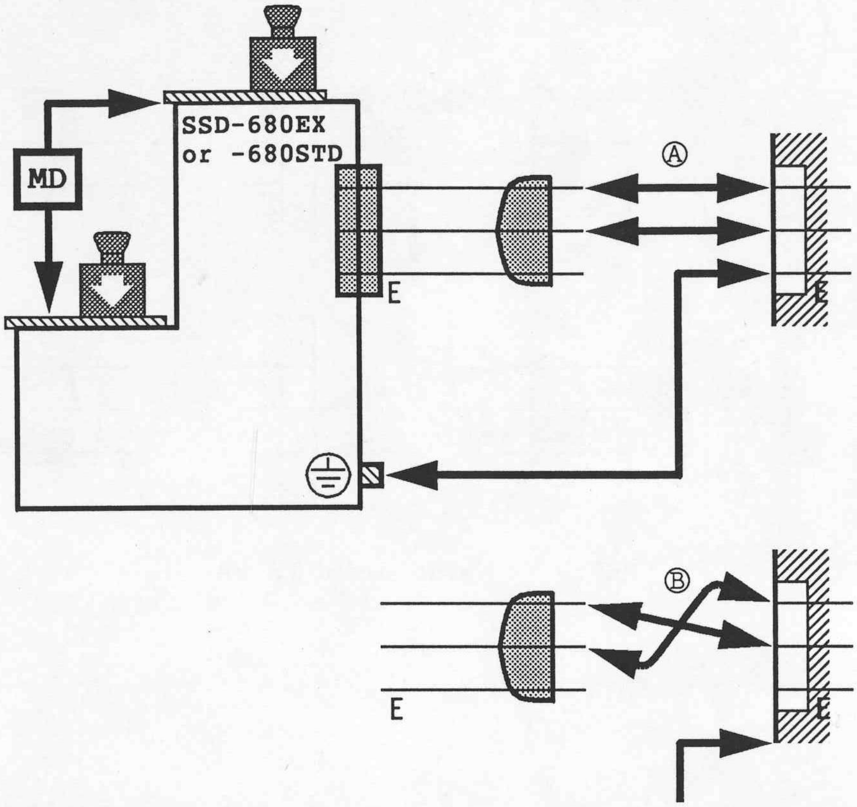


Rating : Not to exceed 0.5 mA

(6)-3 Enclosure leakage current (b)
(Between the enclosures)

① Normal conditions

Referring to the illustration given below, connect a measured unit with a leakage current measuring device (MD).
With two pieces of metal foil (10 cm × 20 cm per piece) placed separately on the enclosure, put weights thereon. Then, connect the leakage current measuring device (MD) to these metal foil pieces.



Using Connection Methods Ⓐ and Ⓑ, determine their respective leakage currents. And take the higher one for the value under the "Normal conditions".

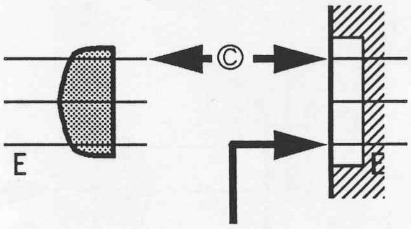
Rating : Not to exceed 0.1 mA

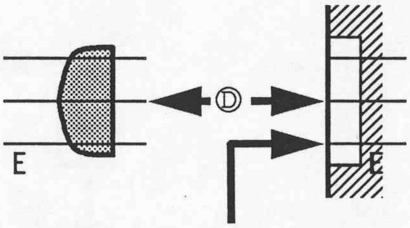
② Single Fault Condition

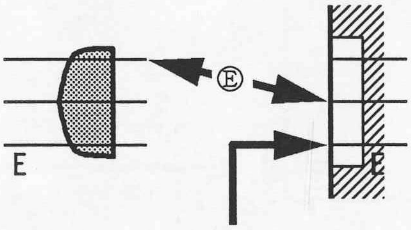
Measure the leakage current without grounding based on Ⓐ and Ⓑ of Normal Connection Method ①.

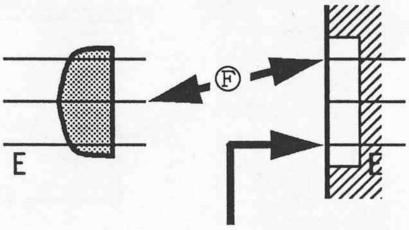
Furthermore, based on Normal Connection Method ①, determine the leakage current at each of Connections Ⓒ thru Ⓕ.

Then, take the highest leakage current of above for the "Single Fault Condition".





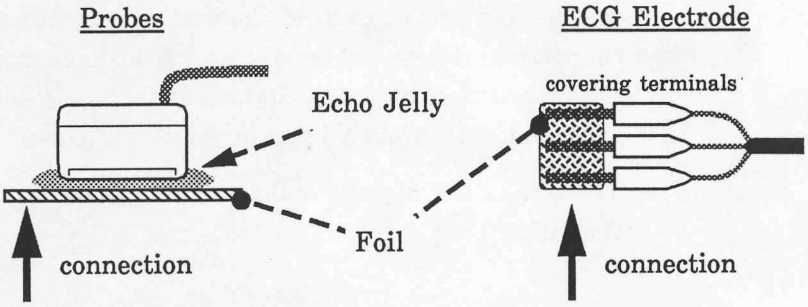




Rating : Not to exceed 0.5 mA

(6)-4 Patient leakage current

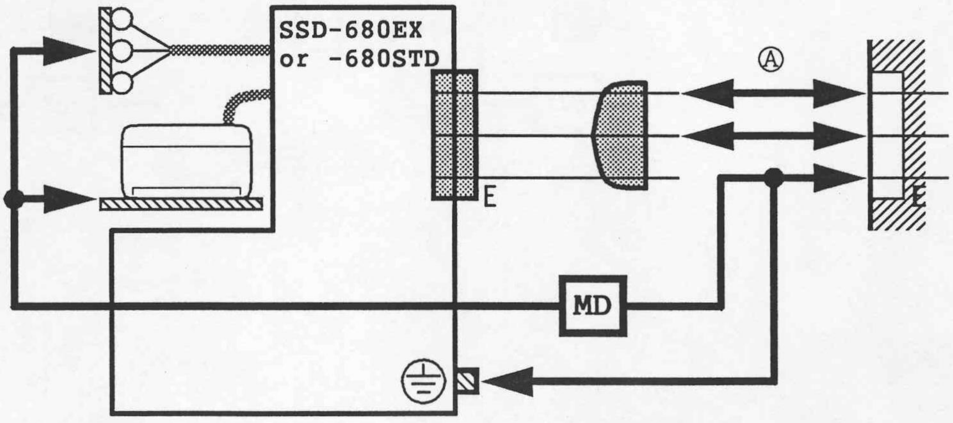
Connect all serviceable probes to the measured equipment. If the physiological signal display unit is installed, moreover, connect the ECG cable, likewise. For the connection method to determine their leakage currents, refer to the illustration below.

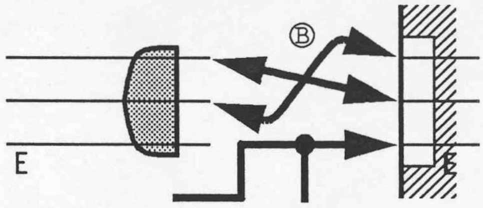

Probes
ECG Electrode
Echo Jelly
covering terminals
Foil
connection
connection

① Normal conditions

Referring to the illustration given below, connect a measured unit with a leakage current measuring device (MD).

The leakage current measuring device (MD), meanwhile, should be connected between the point where all the applied parts (probe, scanner, and ECG cable) are connected and the earth.


SSD-680EX
or -680STD
Ⓐ
E
E
MD



Using Connection Methods Ⓐ and Ⓑ, determine their respective leakage currents. And take the higher one for the value under the "Normal conditions".

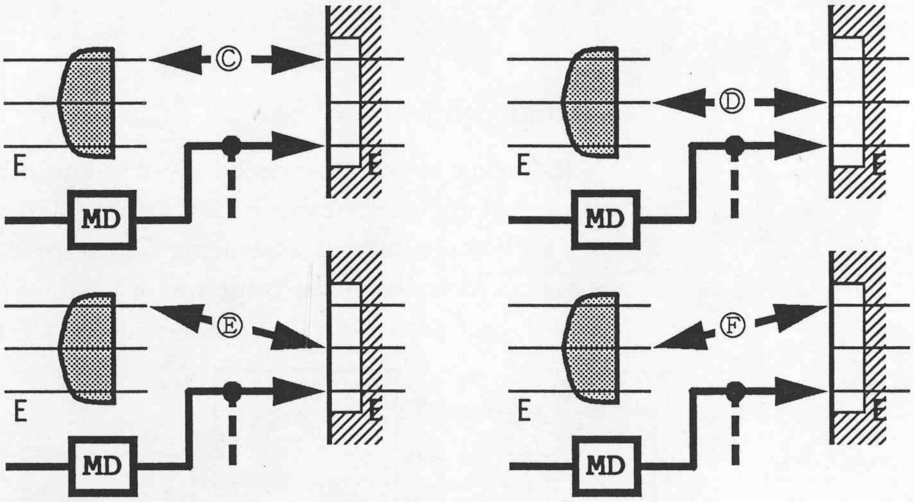
Rating : Not to exceed 0.1 mA

② Single Fault Condition

Measure the leakage current without grounding based on Ⓐ and Ⓑ of Normal Connection Method ①.

Furthermore, based on Normal Connection Method ①, determine the leakage current at each of Connections Ⓒ thru Ⓕ. In each connection, moreover, determine the leakage currents, respectively in the two cases where the equipment is and is not grounded (as indicated with broken lines in the illustration).

Then, take the highest leakage current of above for the "Single Fault Condition".



Rating : Not to exceed 0.5 mA.

10-5 Check sheet

A check sheet is provided to record the performance results after a performance check is performed according to this section. Use the check sheet as a simplified record of the performance check of a unit.

Check sheet for Performance Check of SSD-680EX/STD S/N
Check date Checker

No.	Check item	Details		Confirmed or not		Remarks
				1	2	
10-4-1	Checking for function					
(1)	Confirmation on POWER ON	The system should be started under the initial setting condition (PRESET setting condition).				
(2)	Confirmation of the panel switch operation	MODE	B			
			B/M			
			B/PW			
			FLOW			
			BIB			
			M			
			PW			
		MAGNIFICATION	→↓↑←			
			←↑↓→			
		PROBE	1			
			2			
			IND			
		IMAGE DIRECTION	⧗			
			⟷			
		SELECT	SELECT			
		FREEZE	FREEZE			
		BASE LINE	↓			
			↑			
		VEL RANGE	↓			
			↑			
		PRESET				
		ANNOTAT				
		FUNCTION	MENU			
			DOP MENU			
			FLOW MENU			
			FLOW DISP			
			FOCUS			
			MEASURE			
		TRACKBALL	ZOOM			
		FUNCTION	ANGLE			
			CURSOR			
			FLOW AREA			
			POS1			
			┼			
			╳			
			⁖			
			⁘			
			|⟨⟩|			
			MARK REF			

Check sheet for Performance Check of SSD-680EX/STD S/N

Check date Checker

No.	Check item	Details	Confirmed or not 1	Confirmed or not 2	Remarks
(2)	Confirmation of the panel switch operation	CAMERA			
(3)	Confirmation of menu contents				
(4)	Confirmation of focus				
(5)	Confirmation of measuring function	Setting conditions B, 2B			
		B/M			
		M			
		B/PW			
		PW			
10-4-2	Checking for image quality				
(1)	Confirmation of echoing				
(2)	Confirmation of total sensitivity				
10-4-3	Checking for Safety				
	Appearance Inspection				
	Checking Protected Earth Cable for Continuity				
	Measuring an Insulation Resistance				
	Leakage Currents	Earth leakage current			
		Enclosure leakage current(a)			
		Enclosure leakage current(b)			
		Patient leakage current			

11-1 Power supply Voltage Changing Procedure

11-1-1 If a 100V system unit is changed to other 100V system,

(1) Wire the transtap voltage switching terminal TB501 to obtain the voltage to be changed, with reference to fig. 1.

11-1-2 If a 100V system unit is changed to a 200V system,

(1) Turn relay circuit input switch S1 (refer to Fig. 1) to the 200V system side.
(2) Wire the transtap voltage switching terminal TB501 to obtain the voltage to be changed, with reference to fig. 1.
(3) Replace AC plug, with reference to fig. 2.
(4) Replace Isolation transformer PTU-004 for 200V system. (Refer to Fig.3)

11-1-3 If a 200V system unit is changed to other 200V system,

(1) Wire the transtap voltage switching terminal TB501 to obtain the voltage to be changed, with reference to fig. 1.

11-1-4 If a 200V system unit is changed to a 100V system,

(1) Turn relay circuit input switch S1 (refer to Fig. 1) to the 100V system side.
(2) Wire the transtap voltage switching terminal TB501 to obtain the voltage to be changed, with reference to fig. 1.
(3) Replace AC plug, with reference to fig. 2.
(4) Replace Isolation transformer PTU-004 for 100V system. (Refer to Fig.3)

Fig. 1 Relay circuit input switch S1 、 Transtap voltage switching terminal TB501

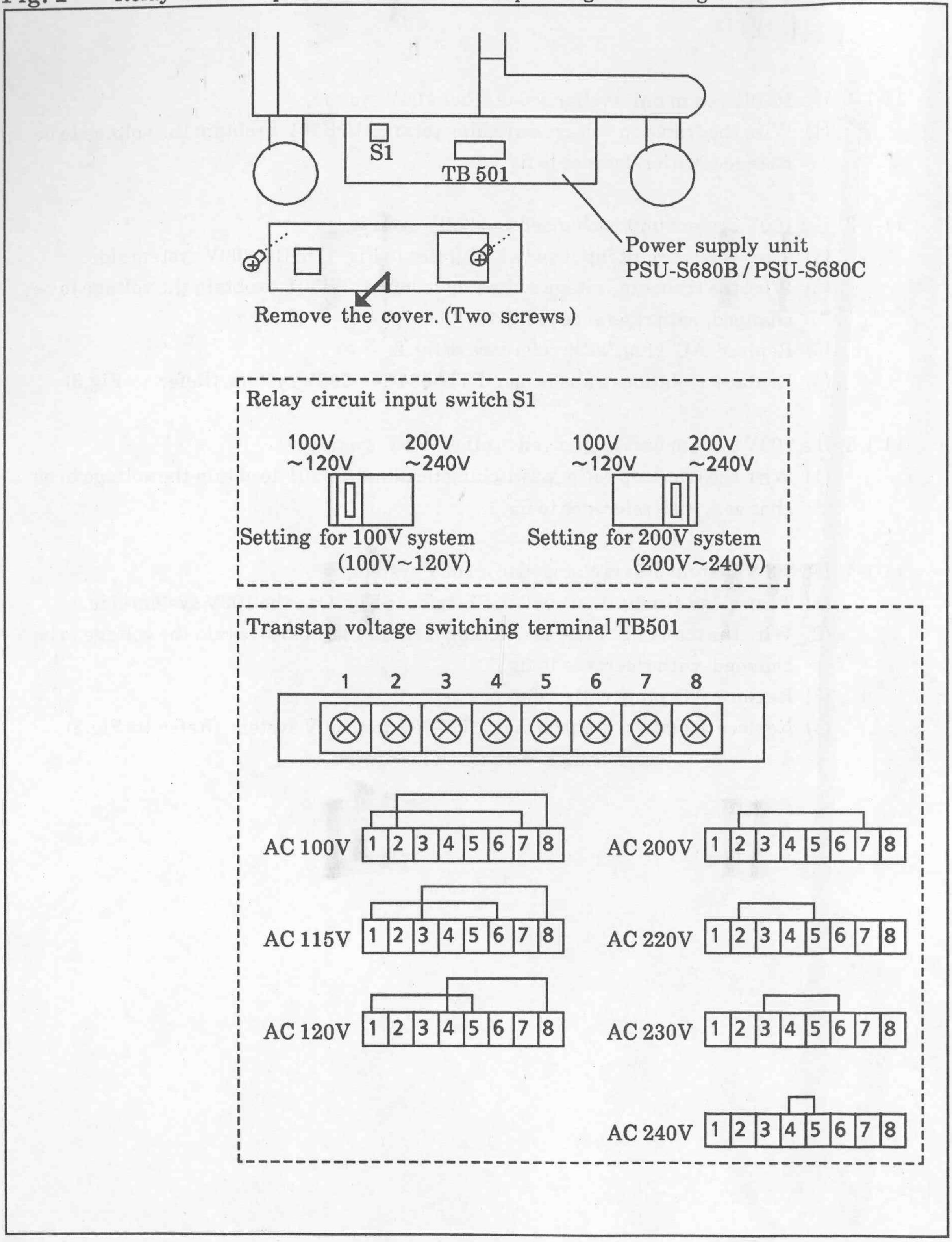

S1
TB 501
Power supply unit
PSU-S680B / PSU-S680C
Remove the cover. (Two screws)
Relay circuit input switch S1
100V ~120V
200V ~240V
100V ~120V
200V ~240V
Setting for 100V system (100V~120V)
Setting for 200V system (200V~240V)
Transtap voltage switching terminal TB501
1 2 3 4 5 6 7 8
AC 100V
AC 115V
AC 120V
AC 200V
AC 220V
AC 230V
AC 240V

Fig.2 AC plug

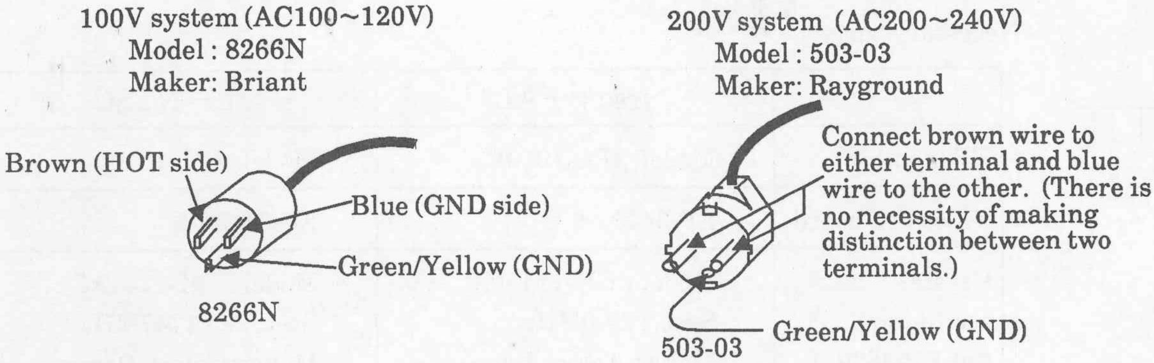
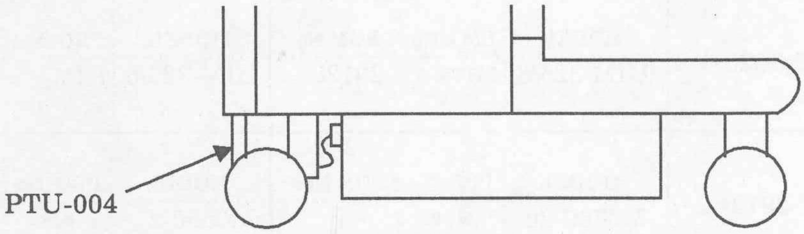

100V system (AC100~120V)
Model : 8266N
Maker: Briant
Brown (HOT side)
Blue (GND side)
Green/Yellow (GND)
8266N
200V system (AC200~240V)
Model : 503-03
Maker: Rayground
Connect brown wire to either terminal and blue wire to the other. (There is no necessity of making distinction between two terminals.)
Green/Yellow (GND)
503-03

Fig.3 Isolation transformer PTU-004



(The differences between 100V system and 200V system in PTU-004 are AC outlets & its mounting plates, fuse, and transtap setting. When you change from 100V system to 200V system or vice versa, replace whole PTU-004.)

11-2 SSD-680EX Scanning Lines Changing Procedure

Necessary parts

<table>
<tr><th></th><th colspan="3">NTSC→PAL</th><th colspan="3">PAL→NTSC</th></tr>
<tr><td>TV monitor</td><td colspan="3">Model: IPC-1010V</td><td colspan="3">Model: IPC-1010</td></tr>
<tr><td>Video ITF board</td><td colspan="3">EP-3443*-6</td><td colspan="3">EP-3443*-5</td></tr>
<tr><td>Crystal oscillator (for EP-3620*)</td><td colspan="3">Model : CK-1145MC
Spec. : 25.0MHz
Maker: Tokyo Denpa
1 pc.</td><td colspan="3">Model : CK-1144AC
Spec. : 25.1747MHz
Maker: Tokyo Denpa
1 pc.</td></tr>
<tr><td>Jumper wire (for EP-3620*)</td><td colspan="3">Unnecessary</td><td colspan="3">3cm</td></tr>
<tr><td rowspan="2">ROM (for EP-3620*) 1 pc.</td><td>MODEL</td><td>PRO. No.</td><td>ROM No.</td><td>MODEL</td><td>PRO. No.</td><td>ROM No.</td></tr>
<tr><td>UIM-325/6</td><td>PHTM</td><td>2012C</td><td>UIM-325/6</td><td>HTM</td><td>2012C</td></tr>
<tr><td rowspan="7">ROM (for EP-2913*-1) 6 pc.</td><td>MODEL</td><td>PRO. No</td><td>ROM No.</td><td>MODEL</td><td>PRO. No</td><td>ROM No.</td></tr>
<tr><td>M0680-2u</td><td>*.*</td><td>1</td><td>M0680-2</td><td>*.*</td><td>1</td></tr>
<tr><td>M0680-2u</td><td>*.*</td><td>2</td><td>M0680-2</td><td>*.*</td><td>2</td></tr>
<tr><td>M0680-2u</td><td>*.*</td><td>3</td><td>M0680-2</td><td>*.*</td><td>3</td></tr>
<tr><td>M3002-0V</td><td>*.* d</td><td>1</td><td>M3002-0U</td><td>*.* d</td><td>1</td></tr>
<tr><td>M3002-0V</td><td>*.* d</td><td>2</td><td>M3002-0U</td><td>*.* d</td><td>2</td></tr>
<tr><td>M3002-0V</td><td>*.* d</td><td>3</td><td>M3002-0U</td><td>*.* d</td><td>3</td></tr>
<tr><td rowspan="6">ROM (for EP-3477*) 5 pc.</td><td>MODEL</td><td>PRO. No.</td><td>ROM No.</td><td>MODEL</td><td>PRO. No.</td><td>ROM No.</td></tr>
<tr><td>UIM-325/6</td><td>POFS</td><td>778Q</td><td>UIM-325/6</td><td>OFS</td><td>778Q</td></tr>
<tr><td>UIM-325/6</td><td>PX$_0$L</td><td>778J</td><td>UIM-325/6</td><td>X$_0$L</td><td>778J</td></tr>
<tr><td>UIM-325/6</td><td>PMDXY</td><td>776Q</td><td>UIM-325/6</td><td>MDXY</td><td>776Q</td></tr>
<tr><td>UIM-325/6</td><td>PCDXY</td><td>776N</td><td>UIM-325/6</td><td>CDXY</td><td>776N</td></tr>
<tr><td>UIM-325/6</td><td>PX$_0$H</td><td>776J</td><td>UIM-325/6</td><td>X$_0$H</td><td>776J</td></tr>
</table>

Note (1) PRO. No *.* of ROM for EP-2913*-1 differs from SSD-680EX's version. For detail, refer to History of SSD-680EX.

(2) PRO. No of ROM for EP-3477* changes according to specification change. (Ex. OFS→OFS1→OFS2)
For detail, refer to History of SSD-680EX.

Changing method

(1) Replacement of TV monitor

Replace TV monitor.

NTSC …… IPC-1010

PAL …… IPC-1010V

(2) Replacement of VIDEO ITF board

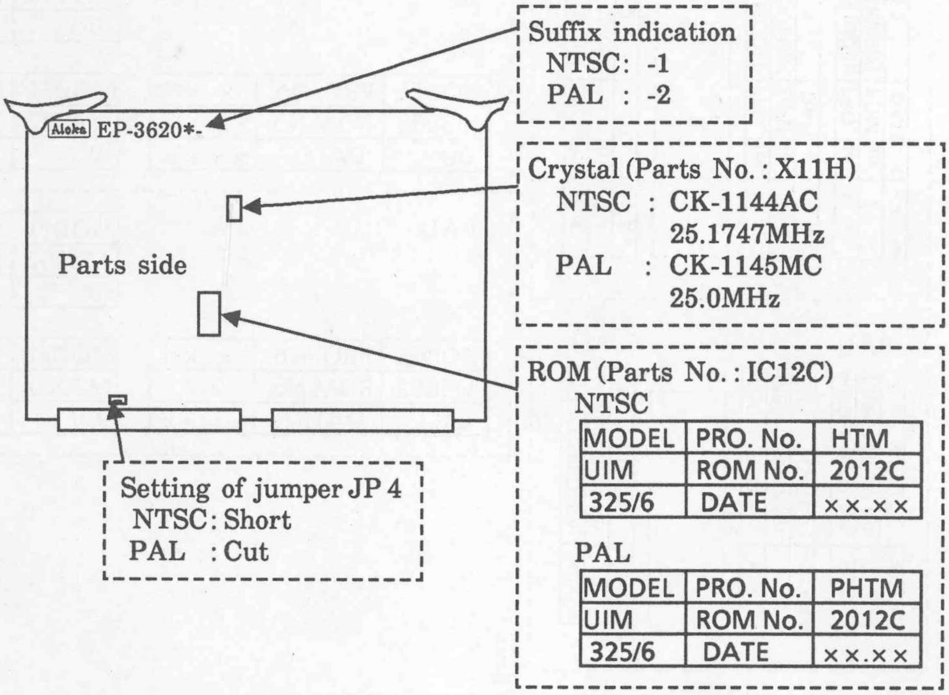
Replace VIDEO ITF board in DSC unit UIM-325.

NTSC …… EP-3443*-5

PAL …… EP-3443*-6

(3) Modification of EP-3620*

Replace a crystal, replace ROM, make setting of a jumper, and change suffix.



Suffix indication
NTSC: -1
PAL : -2

Crystal (Parts No. : X11H)
NTSC : CK-1144AC
25.1747MHz
PAL : CK-1145MC
25.0MHz

ROM (Parts No. : IC12C)

NTSC

MODEL	PRO. No.	HTM
UIM	ROM No.	2012C
325/6	DATE	××.××

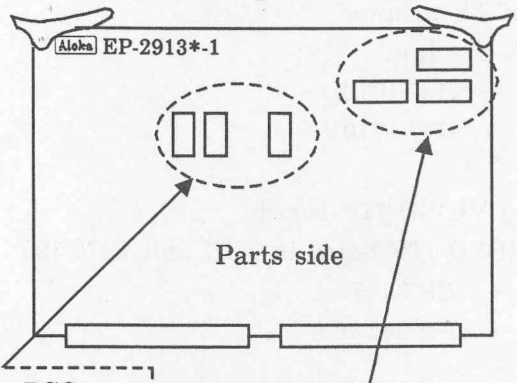
PAL

MODEL	PRO. No.	PHTM
UIM	ROM No.	2012C
325/6	DATE	××.××

Setting of jumper JP 4
NTSC: Short
PAL : Cut

(4) Replacement of ROMs on EP-2913∗-1

Replace six software ROMs.



Software ROMs for DSC control

NTSC

MODEL	PRO. No.	x.x
M0680	ROM No.	2
2	DATE	xx.xx

MODEL	PRO. No.	x.x
M0680	ROM No.	3
2	DATE	xx.xx

MODEL	PRO. No.	x.x
M0680	ROM No.	1
2	DATE	xx.xx

PAL

MODEL	PRO. No.	x.x
M0680	ROM No.	2
2u	DATE	xx.xx

MODEL	PRO. No.	x.x
M0680	ROM No.	3
2u	DATE	xx.xx

MODEL	PRO. No.	x.x
M0680	ROM No.	1
2u	DATE	xx.xx

Software ROMs for Measurement

NTSC

MODEL	PRO. No.	x.xd
M3002	ROM No.	3
0U	DATE	xx.xx

MODEL	PRO. No.	x.xd
M3002	ROM No.	2
0U	DATE	xx.xx

MODEL	PRO. No.	x.xd
M3002	ROM No.	1
0U	DATE	xx.xx

PAL

MODEL	PRO. No.	x.xd
M3002	ROM No.	3
0V	DATE	xx.xx

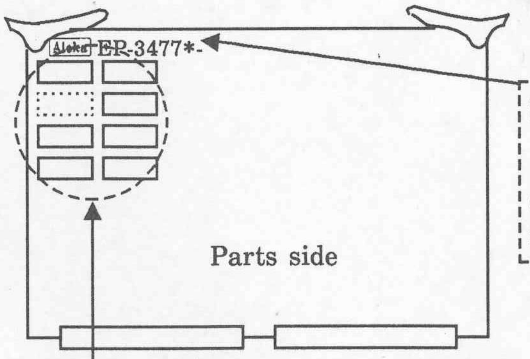
MODEL	PRO. No.	x.xd
M3002	ROM No.	2
0V	DATE	xx.xx

MODEL	PRO. No.	x.xd
M3002	ROM	1
0V	DATE	xx.xx

PCB version must be "B" or more.
(EP-2913-1 used in the early model of SSD-680 have the different ROM locations. However SSD-680EX / SSD-680STD use EP-2913B-1 from the beginning, and the above locations can be used.)

(5) Replacement of ROMs on EP-3477*

Replace five ROMs, and change suffix.



Suffix indication
NTSC: -1
PAL : -2
(On this board, the difference in suffix is ROMs only.)

NTSC

MODEL	PRO. No.	OFS
UIM	ROM No.	778Q
325/6	DATE	××.××

MODEL	PRO. No.	MDXY
UIM	ROM No.	776Q
325/6	DATE	××.××

MODEL	PRO. No.	CDXY
UIM	ROM No.	776N
325/6	DATE	××.××

No need to replace.
(Common to NTSC and PAL.)

No need to replace.
(Common to NTSC and PAL.)

MODEL	PRO. No.	X_0L
UIM	ROM No.	778J
325/6	DATE	××.××

MODEL	PRO. No.	X_0H
UIM	ROM No.	776J
325/6	DATE	××.××

PAL

MODEL	PRO. No.	POFS
UIM	ROM No.	778Q
325/6	DATE	××.××

MODEL	PRO. No.	PMDXY
UIM	ROM No.	776Q
325/6	DATE	××.××

MODEL	PRO. No.	PCDXY
UIM	ROM No.	776N
325/6	DATE	××.××

No need to replace.
(Common to NTSC and PAL.)

No need to replace.
(Common to NTSC and PAL.)

MODEL	PRO. No.	PX0L
UIM	ROM No.	778J
325/6	DATE	××.××

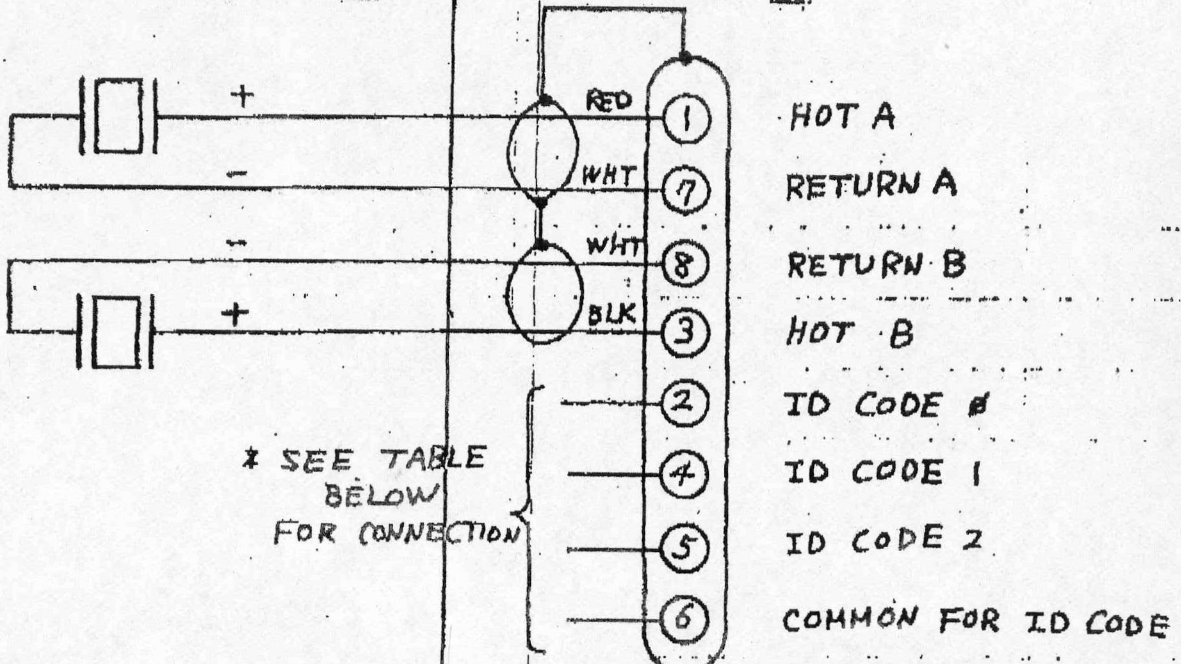
MODEL	PRO. No.	PX_0H
UIM	ROM No.	776J
325/6	DATE	××.××

Note PRO. No. changes according to the specification change.
(Ex. OFS→OFS1→OFS2)
For detail, refer to History of SSD-680EX.

SSD-680EX ISTD Manual Change Information

Ver.	Date	Contents		Page	Note
1	08 Apr. '93	1st. edition			
2	20 May '93	Title page(1/2)	Replaced		
		Title page(2/2) Contents(2/2)	Replaced Replaced	1~2	
		Section 13 " Parts List"	Added	13-1~13-94	
3	01 Oct.'93	Title page(1/2)	Replaced		
		Title page(2/2) Contents(2/2)	Replaced Replaced	1~2	
		Section 9 "9-4-3 EP-3463 VBPF & GAIN CONTROLL" "9-4-4 EP-3459 Rx FOCUS"	Replaced Replaced	9-5~9-6 9-7~9-8	
		Section 11 "Manual Change Information"	Added	11-9~11-10	
		Section 15 "15-2-1 Description of System" "15-2-2 Panel Information signal flow" "15-2-3 B/W signal flow" "15-2-4 Color signal flow" "15-2-6 DSC Unit"	Replaced Replaced Replaced Replaced Replaced	15-7~15-8 15-9~15-10 15-11~15-12 15-13~15-14 15-19	
4	22 JuL'94	Title page(1/2) Contents(1/2) Back cover(1/2)	Replaced Replaced Added	1~6	
		Title page(2/2) Contents(2/2) Back cover(2/2)	Replaced Replaced Added	1~4	
		Section 3 "Before Repairing"	Replaced and added	3-1~3-15	Previously pages were 3-1~3-3.
		Section 8 "Trouble Shooting"	Replaced	8-3~8-6	
		Section 10 "Performance Check"	Replaced and added	10-1~10-28	Previously pages were 10-1~10-13.
		Section 11 "Manual Change Information"	Replaced	11-9, 11-10	
		Section 12 "HISTORY"	Added	12-1	

AE-9777 -YN 2/2


+
−
RED
WHT
−
WHT
+
BLK
1
7
8
3
2
4
5
6
HOT A
RETURN A
RETURN B
HOT B
ID CODE ø
ID CODE 1
ID CODE 2
COMMON FOR ID CODE
* SEE TABLE BELOW FOR CONNECTION

CONNECTOR:
DIN
E 8701B-00

UST-2262-2

UST-2263-2/3

PROBE FREQUENCY	ID CODING CONNECTION
2 MHz	2 — 6 4 (OPEN) 5 — 6
2-3 MHz	2 (OPEN) 4 — 6 5 (OPEN)
5 MHz	2 (OPEN) 4 (OPEN) 5 — 6

NOTE 1) INDUCTORS AND/OR OTHER REQUIRED COMPONENTS ARE NOT SHOWN IN THIS DIAGRAM.

NOTE 2) SYSTEMS APPLICABLE
ALOKA 730
ALOKA 725
ALOKA 860
ALOKA 870
ALOKA 650
ALOKA 633

Aloka	TITLE 名称 SCHEMATIC DOPPLER INDEPENDENT PROBES				MODEL 形名	1/1
3RD ANGLE PROJECTION 第3角法	DRAWN 製図	DESIGNED 設計	CHECKED 検図	APPO 承認	DRAWING NO. 図番	
SCALE 尺度	MK 8-31-88	– –	– –	– –		
UNITS 単位 mm						

12-1 HISTORY of this equipment

This equipment may have the history upon the specification. Please refer to the "HISTORY" of this equipment which is separately prepared for the field service on your repair and modification work.

SSD-680EX / SSD-680STD SERVICE MANUAL 2/2

MN2-0187

Aloka ALOKA CO.,LTD.
6-22-1 MURE, MITAKA-SHI, TOKYO, JAPAN
TELEPHONE : 81-422-45-5111
FAX : 81-422-48-5058

Rev. 4 (22-Jul.-1994)

HISTORY OF SSD-680STD

S/N 21M08242~31M01345

HI - 1902

Ver. 1

28 - Sep. -1993

Caution

The purpose of this document is maintenance only.
Do not use this for other purpose.

1 ECHO CAMERA STANDARD UNIT .... 1 - 1
2 PSC-120* (Main body) PCB .... 2 - 1
3 GEU-65* (TX / RX unit) PCB .... 3 - 1
4 UIM-326* (DSC unit) PCB .... 4 - 1
5 UGR-680STD* (Optional Doppler unit) PCB .... 5 - 1
6 CFM-680STD* (Optional color unit) PCB .... 6 - 1
7 PEU-680* (Optional ECG display unit) PCB .... 7 - 1
8 REMARKS (Explanation of the remarks ★ in the section 1to 6) .... 8 - 1
9 PROBE CONNECTION .... 9 - 1
10 ROM (Software, hardware) .... 10 - 1 ~ 10 - 7
11 SPECIFICATION CHANGE LIST .... 11 - 1 ~ 11 - 2
12 MODIFICATION KIT (S/N⇆Version⇆Upgrade kit) .... 12 - 1 ~ 12 - 2

HISTORY OF SSD-680STD (STANDARD UNIT)

← : One directional interchangeability ⇆ : Bi-directional interchangeability ≠ : No interchangeability

Version	6.1	6.2	6.3							
S/N	21M08243~ 08262	31M01326~ 01335	31M01336~ 01345							
MAIN BODY	PSC-120									
TX/RX unit	GEU-65									
DSC unit	UIM-326									
Power supply unit	PSU-S680B									
Power supply unit	PSU-S680B PSU-S680C ⇆ ★1 21M08253~									
Isolation Trans.	PTU-004									
TV monitor NTSC For domestic	IP-1230C-TH									
TV monitor NTSC For export	IP-1230C-TH									
TV monitor PAL For export	IP-1230CV-TH									

* : Correction of artwork

HISTORY OF SSD-680STD (PSC-120* Main body PCB)

← : One directional interchangeability ⇆ : Bi-directional interchangeability ≠ : No interchangeability

Version	6.1	6.2	6.3							
S/N	21M08243~ 08262	31M01326~ 01335	31M01336~ 01345							
MAIN CONTROL	EP-3265B-3									
MAIN PANEL	L-KEY-19D									
BLIND PANEL	EP-2512B-1									
POWER LAMP	EP-3143									
HEAD PHONE JACK	EP-2510									
Full Key board	L-KEY-26									

* : Correction of artwork

HISTORY OF SSD-680STD (GEU-64* TX / RX unit PCB)

← : One directional interchangeability ⇆ : Bi-directional interchangeability ≠ : No interchangeability

Version	6.1	6.2	6.3							
S/N	21M08243~ 08262	31M01326~ 01335	31M01336~ 01345							
PROBE SELECT RELAY (2sets)	EP-3453-1~4									
PROBE SELECTOR	EP-3454B									
RX SELECT	EP-3455C									
TX 1	EP-3456									
TX 2	EP-3457									
Pre AMP	EP-3458B									
RX FOCUS (2 PCBs)	EP-3459B	EP-3459C ← ★10								
MAIN AMP & COLOR ITF	EP-3461B-1	EP-3461D-2 ← ★15								
VBPF & GAIN CONTROL	EP-3463	EP-3463 ← ★12								
TX TRIGGER GENE	EP-3464B	EP-3464C ← ★2								
GEU TIMING & ADDRESS	EP-3465C ←★3 (21M08253~)	EP-3465D ← ★4	EP 3465 D E	Version E wird nur für Independent Probes benutzt. siehe beiliegende Modifikationsanweisung						
GEU INTERFACE	EP-3452B									
RX SELECT CONT	EP-3452									
MOTHER BOARD	EP-3466B									

* : Correction of artwork

HISTORY OF SSD-680STD (UIM-326* DSC unit PCB)

← : One directional interchangeability ⇆ : Bi-directional interchangeability ≠ : No interchangeability

Version	6.1	6.2	6.3							
S/N	21M08243~ 08262	31M01326~ 01335	31M01336~ 01345							
B/W MEMORY	EP-3247B									
DSC ADDRESS	EP-3236E									
DSC TIMING (NTSC)	EP-3620-1									
DSC TIMING (PAL)	EP-3620-2									
A/D, D/A	EP-2729H-8									
DUAL MPU	EP-2913B-1									
AGDC	EP-2629D									
US ITF (NTSC)	EP-3477B-1	EP-3477C-1 ← ★5 (21M08248~)								
US ITF (PAL)	EP-3477B-2	EP-3477C-2 ← ★5 (21M08248~)								
COLOR D/A	EP-2651E-3									
FOOT SW CONNECTOR	EP-2700									
SVHS CONNECTOR	EP-3179									
B/W CINE MEMORY	EP-3237B									
MOTHER BOARD	EP-3467C	EP-3467D ← ★7 (21M08253~)								

* : Correction of artwork

31206533329

9254

ALOKA EUROPE TELEFAX

Date: 20-12-1996	Reference: FB-2219	Page 1 of 3

To : Aloka Deutschland
Dept.: Technical Dept.
Attn.: Mr.H-G.Rokita
Country: Germany
Fax : 0049 69 839189
Loc. :

CC: Mr.S.Aoyama
Loc.: Technical Manager

From : ALOKA EUROPE
F. van Beek
Logistics Supervisor
Fax : (31) 20 6533329
Phone: (31) 20 6533479
Telex: 71372 ALOKA NL

SUBJECT: SHIPMENT OF EP-3465D FOR YOUR ORDER 359 OF MAY 1995

Dear Roki-san,

In May 1995 !! you ordered the above mentioned PCB at Aloka Europe. Only you have ordered the revision EP-3465E.

EP-3465E seems to be out of production so Aloka Japan finally decided to ship EP-3465D. You can use the -D version as long as the doctor for which you needed the board does not use Independent Probe with Doppler Mode. If the doctor does use Independent Probe with Doppler Mode the board needs to be modified.

Please find attached to this fax the modification procedure for the EP-3465D if the doctor uses the mentioned application. If you have any questions about this modification, please contact Mr. Aoyama.

Thanking you in advance for your cooperation and have a very merry Christmas.

Best regards,

Frank.

EP-3465D SSD-680EX

ALOKA Europe Internal Memo

To: Beek-san
From: S. Aoyama
Date: 28-Nov-1996
Subject: Compatibility of EP-3465D for revision E
CC:

Dear Beek-san,

I have checked the compatibility and difference between EP-3465 revision D and E.
The difference on the function is only for Independent Probe with Doppler mode. If they don't use the machine with this combination, the revision D can be used for E.

If they really need revision E, it requires the following modification on hardware circuit and replacement of ROMs,

1.	Remove component	Crystal X2, P/N: TCO-707F(10MHz)
2.	Add component	IC 1B, P/N: HC163
3.	Pattern cut (component side)	between IC 8C pin 13 and GND
		between IC 8C pin 12 and GND
		between IC 4K pin 5 and GND
4.	Pattern cut (soldering side)	between IC 4K pin 4 and GND
		between IC 3P pin 9 and IC 6C pin 3
5.	Add jumper wire	between IC 1B pin 16 and IC 1C pin 14
		between IC 1B pin 13 and IC 4K pin 5
		between IC 1B pin 12 and IC 4K pin 4
		between IC 1B pin 12 and IC 6C pin 3
		between IC 1B pin 10 and IC 1D pin 16
		between IC 1B pin 9 and IC 8C pin 11
		between IC 1B pin 8 and IC 1C pin 7
		between IC 1B pin 7 and IC 1E pin 16
		between IC 1B pin 6 and IC 1D pin 8
		between IC 1B pin 5 and IC 1E pin 8
		between IC 1B pin 4 and IC 1F pin 8
		between IC 1B pin 3 and IC 1F pin 16
		between IC 1B pin 2 and IC 1H pin 9
		between IC 1B pin 1 and IC 1G pin 16
		between IC 4K pin 6 and IC 8C pin 12
		between IC 8C pin 10 and IC 8C pin 13

Then, all ROMs must be replaced with ones on the original board which is defective now.

We can make them in our office, but cannot check the operation after the modification because we don't have SSD-680EX as our test-bench.

If they need the modification and they accept to do by themselves, please give them above information attaching with board.

Regards.

HISTORY OF SSD-680STD (UGR-680STD* Optional Doppler unit PCB)

← : One directional interchangeability ⇆ : Bi-directional interchangeability ≠ : No interchangeability

S/N	21M14104~ 14123									
DOP TXRX	EP-3260B									
DOP CONTROLLER	EP-2810B-4									
DOP FILTER	EP-3259C									
DOP INTERFACE	EP-2812B-1									
FFT BOARD	Frequency analyzer (NJK-196A) made by JRC									
OUTPUT BOARD										
MOTHER BOARD	EP-2808									

* : Correction of artwork

HISTORY OF SSD-680STD (CFM-680STD* Optional color unit PCB)

← : One directional interchangeability ⇆ : Bi-directional interchangeability ≠ : No interchangeability

PCB S/N	2409001~ 2409010										
COLOR POST PROCESS	EP-3114E										
COLOR MEMORY VEL	EP-2213B										
COLOR MEMORY VAR	EP-2213B-1										
COLOR CINE MEMORY	EP-3238										
VIDEO ITF (NTSC)	EP-3443B-5 (Not manufactured)										
VIDEO ITF (PAL)	EP-3443B-6										
COLOR D/A	EP-2651E-4										
COLOR POST PROCESS	EP-3115D										
MAIN AMP & COLOR ITF	EP-3461B-1										
COLOR CAL	EP-5100B (PM-680EX-4 for EP-5100C)										
COLOR MONITOR (NTSC)	IPC-1010 (Not manufactured)										
COLOR MONITOR (PAL)	IPC-1010V										

* : Correction of artwork

8

HISTORY OF SSD-680STD (PEU-680* Optional ECG display unit PCB)

← : One directional interchangeability ⇆ : Bi-directional interchangeability ≠ : No interchangeability

S/N of PEU-680*	31M01484~ 01493										
ECG signal display unit	PEU-680B ★9										
ECG SIGNAL UNIT	EU-5026										
PHYSIO AMP	EP-3117C										
ECG PANEL	L-KEY-8B										
ECG MEMORY (in DSC unit)	EP-2841C										

* : Correction of artwork

HISTORY OF SSD-680EX for export (Explanation of ★ mark)

No.	Explanation of ★ mark	Note
★ 1	PSU-S680B······ Power supply unit for SSD-680EX/STD which is a modified SSD-680 power supply unit. PSU-S680C······ New power supply unit which is designed for SSD-680EX/STD. Both types of power supply unit are electrically and mechanically identical.	PSU-S680B→PSU-S680C
★ 2	Improvement for noise problem that appeared near the transmitting wave signal on the image of B/FLOW or B/*/D at minimum transmitting power.	EP-3464B→EP-3464C
★ 3	Improvement for lateral line color noise problem that appeared on the image when using 5MHz or 7.5MHz probe. (It occurred on five systems out of 15 when using EP-5100C.	EP-3465B→EP-3465C
★ 4	Improvement for the ECG SYNC problem. Correction of the artwork.	EP-3465C→EP-3465D
★ 5	Improvement for an unnecessary display.	EP-3477B-1→EP-3477C-1, EP-3477B-2→EP-3477C-2
★ 6	Improvement for the display method of strong color signal. Addition of the Spacial Filter function for the variance. Color noise reduction (improvement of the dynamic range)	EP-5100B→C
★ 7	Improvement of the external video signal switching problem. Improvement of the EXT B/W OUT problem.	EP-3467B→D
★ 8	Improvement of the FFT malfunction.	EP-2810B-3→B-4
★ 9	PEU-680B is a ECG signal display unit for SSD-680EX/STD. (PEU-680 is for only SSD-680.) PEU-680B = PEU-680 + CABLE4 + CABLE 34	PEU-680→680B
★ 10	Improvement of the RX DELAY noise (slanting).	EP-3459B→C
★ 11	Improvement of the frequency characteristic.	EP-3461B-1→C-1
★ 12	Improvement of the lateral arc line noise (by changing the wiring only). Therefore, no suffix change.	
★ 13	Improvement of the vertical striped noise when using SSZ-305.	EP-3443C-5→C-15 EP-3443C-6→C-16
★ 14	Improvement of the EMI.	EP-2510→-1, EP-2812B→B-1
★ 15	Improvement of the image quality (by changing the buffer amp.).	EP-3461C-1→D-1
★ 16	Improvement of the frequency characteristic of the video signal.	EP-3443B-1→B-5, EP-3443B-2→B-6
★ 17	Part change 2SC503 (Q1, Q2, Q3, Q9) to 2SC2235. Elimination of the parts (C251, 253, 255).	EP-3443B-5→C-5, EP-3443B-6→C-6
★ 18	Improvement of dynamic range as changing a fixed number of pre amplifier.	EP-3458B→C
★ 19	Improvement of dynamic range as changing a fixed number.	EP-3459C→D
★ 20	Corresponding to 2.5MHz probe. The function of flow gain is eliminated on EP-3461, because of EP-5100 control.	EP-3461D-1→E-1

HISTORY OF SSD-680EX for export (Explanation of ★ mark)

No.	Explanation of ★ mark	Note
★ 21	Corresponding to center angle F0. This function isn't used as things are.	EP-3463→B
★ 22	Corresponding to image select.	EP-3464C→D
★ 23	Decrease of side band noise as using an independent probe.	EP-3465D→E
★ 24	Improvement of functions of electronic sector probe. This functions are not used as things are.	EP-3466B→C
★ 25	Correction of the artwork , addition of new transvaginal probe UST-996P-5.	EP-3236E→F
★ 26	Improvement of signal to noise ratio and frequency band width.	EP-2729F-7→F-9
★ 27	The number of measurement ROMs increase from three to four. If Main control;EP-3265 has ROMs of version 7.1,this PCB has a directional interchangeability;"←".	EP-2913B-1→B-2
★ 28	It changes a control method of Flow gain from analog to digital. Improvement for wall motion.	EP-2651E-4→E-5
★ 29	Corresponding to Ver.7.1.	EP-5100C→D
★ 30	Corresponding to tuning circuit of 2.5MHz.	EP-3260B→C

HISTORY OF SSD-680EX for export (Probe Connection)

Model	TYPE	Note	Software Version ○ : connectable × : unconnectable △: see note				
			6.0	6.2	6.3	6.4	7.1
UST-958-7.5	C		○	○	○	○	○
UST-959-3.5	C		○	○	○	○	○
UST-960-5	C		○	○	○	○	○
UST-961-5	C		○	○	○	○	○
UST-961-7.5	C		○	○	○	○	○
UST-962-5	C		○	○	○	○	○
UST-964P-5	C		○	○	○	○	○
UST-965-3.5	C		○	○	○	○	○
UST-966-3.5	C		○	○	○	○	○
UST-967-5	C		○	○	○	○	○
UST-968P-5	C		○	○	○	○	○
UST-969-5	C		○	○	○	○	○
UST-970-7.5	C		○	○	○	○	○
UST-996P-5	C		×	×	×	×	○
UST-998-2.5	C		×	×	×	×	○
UST-999-5	C		×	×	×	×	○
UST-667P-5	C		○	○	○	○	○
UST-5042-3.5	L		○	○	○	○	○
UST-5043P-3.5	L		○	○	○	○	○
UST-5518-7.5	L		○	○	○	○	○
UST-5525-5	L	Steerable linear	×	×	×	×	○
UST-5525-7.5	L	Steerable linear	○	○	○	○	○
UST-5817-5	L		○	○	○	○	○
UST-576T-7.5	L		○	○	○	○	○
UST-577-7.5	L		○	○	○	○	○
UST-5523-7.5	L		○	○	○	○	○

▸TYPE : A: Annular array, B: Biplane, C: Convex sector, I: Independent, L: Linear array, M: Mechanical sector, P: Phased array sector, R: Radial, S: Single element
SC: Steerable CW doppler, IC: Indipendent CW doppler

Caution Be noted that the probe connectability information is solely based upon the engineering stand point.

HISTORY OF SSD-680EX for export (Probe Connection)

Model	TYPE	Note	Software Version ○ : connectable × : unconnectable △: see note																								
			6.0	6.2	6.3	6.4	7.1																				
UST-666-5/7.5	B		○	○	○	○	○																				
UST-2262-2	IC		○	○	○	○	○																				
UST-2266U-5	IC		×	×	×	×	○																				

▸TYPE : A: Annular array, B: Biplane, C: Convex sector, I: Independent, L: Linear array, M: Mechanical sector, P: Phased array sector, R: Radial, S: Single element
SC: Steerable CW doppler, IC: Indipendent CW doppler

Caution Be noted that the probe connectability information is solely based upon the engineering stand point.

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HISTORY OF SSD-680STD

(Explanation of ★ mark)

No.	Explanation of ★ mark	Note
★ 1	PSU-S680B······ Power supply unit for SSD-680EX/STD which is a modified SSD-680 power supply unit. PSU-S680C······ New power supply unit which is designed for SSD-680EX/STD. Both types of power supply unit are electrically and mechanically identical.	PSU-S680B→PSU-S680C
★ 2	Improvement for noise problem that appeared near the transmitting wave signal on the image of B/FLOW or B/*/D at minimum transmitting power.	EP-3464B→EP-3464C
★ 3	Improvement for lateral line color noise problem that appeared on the image when using 5MHz or 7.5MHz probe. (It occurred on five systems out of 15 when using EP-5100C.	EP-3465B→EP-3465C
★ 4	Improvement for Doppler noise and ECG SYNC problem.	EP-3465C→EP-3465D
★ 5	Improvement for an unnecessary display.	EP-3477B-1→EP-3477C-1, EP-3477B-2→EP-3477C-2
★ 6	Open	
★ 7	Improvement of the external video signal switching problem. Improvement of the EXT B/W OUT problem.	EP-3467C→D
★ 8	Open	
★ 9	PEU-680B is a ECG signal display unit for SSD-680EX/STD. (PEU-680 is for only SSD-680.) PEU-680B = PEU-680 + CABLE4 + CABLE 34	PEU-680→680B
★ 10	Improvement of the RX DELAY noise (slant).	EP-3459B→C
★ 11	Open	
★ 12	Improvement of the lateral line noise.	
★ 13	Open	
★ 14	Open	
★ 15	Improvement of the image quality (by changing the buffer amp).	EP-3461B-1→D-1

HISTORY OF SSD-680STD (Probe Connection)

Model	TYPE	Note	Software Version ○ : connectable × : unconnectable △: see note																								
			6.0	6.2	6.3																						
UST-958-7.5	C		○	○	○																						
UST-959-3.5	C		○	○	○																						
UST-960-5	C		○	○	○																						
UST-961-5	C		○	○	○																						
UST-961-7.5	C		○	○	○																						
UST-962-5	C		○	○	○																						
UST-964P-5	C		○	○	○																						
UST-965-3.5	C		○	○	○																						
UST-966-3.5	C		○	○	○																						
UST-967-5	C		○	○	○																						
UST-968P-5	C		○	○	○																						
UST-969-5	C		○	○	○																						
UST-970-7.5	C		○	○	○																						
UST-667P-5	C		○	○	○																						
UST-5042-3.5	L		○	○	○																						
UST-5043P-3.5	L		○	○	○																						
UST-5518-7.5	L		○	○	○																						
UST-5525-7.5	L	Steerable linear	○	○	○																						
UST-5817-5	L		○	○	○																						
UST-576T-7.5	L		○	○	○																						
UST-577-7.5	L		○	○	○																						
UST-5523-7.5	L		○	○	○																						
UST-666-5/7.5	B		○	○	○																						
UST-2262-2	IC		○	○	○																						

▸TYPE : A: Annular array, B: Biplane, C: Convex sector, I: Independent, L: Linear array, M: Mechanical sector, P: Phased array sector, R: Radial, S: Single element
SC: Steerable CW doppler, IC: Indipendent CW doppler

Caution Be noted that the probe connectability information is solely based upon the engineering stand point.

HISTORY OF SSD-680STD (Software ROM)

(— : not mounted, ← : same as left, ▨ : not exist)

Version	Ver. 6.1	Ver. 6.2	Ver. 6.3						
PCB S/N	21M08243~ 08262	31M01326~ 01335	31M01336~ 01345						
EP-3265* PANEL For NTSC & PAL	M0680-1-6.1-1	M0680-1-6.2-1	M0680-1-6.3-1						
	M0680-1-6.1-2	M0680-1-6.2-2	M0680-1-6.3-2						
	M0680-1-6.1-3	M0680-1-6.2-3	M0680-1-6.3-3						
	M0680-1-6.1-4	M0680-1-6.2-4	M0680-1-6.3-4						
EP-2913* DSC For NTSC	M0680-2-6.1-1	M0680-2-6.2-1	←						
	M0680-2-6.1-2	M0680-2-6.2-2	←						
	M0680-2-6.1-3	M0680-2-6.2-3	←						
For PAL	M0680-2u-6.1-1	M0680-2u-6.2-1	←						
	M0680-2u-6.1-2	M0680-2u-6.2-2	←						
	M0680-2u-6.1-3	M0680-2u-6.2-3	←						
MEASUREMENT	M3002-0U-4.0d-1	←	←						
For NTSC	M3002-0U-4.0d-2	←	←						
	M3002-0U-4.0d-3	←	←						
For PAL	M3002-0V-2.0d-1	←	←						
	M3002-0V-2.0d-2	←	←						
	M3002-0V-2.0d-3	←	←						
EP-2629* GDC For NTSC & PAL	M1010-4.0a-1	←	←						
	M1010-4.0a-2	←	←						
EP-2810* DOP CONTROLLER									
For NTSC & PAL	M2006-1.0-1	←	←						
	M2006-1.0-2	←	←						

HISTORY OF SSD-680STD (Hardware ROM in the TX / RX unit)

(— : not mounted, ← : same as left, ▨ : not used)

Version PCB S/N	Ver. 6.1	Ver. 6.2	Ver. 6.3						
	21M08243~ 08262	31M01326~ 01335	31M01336~ 01345						
EP-3459* (RX FOCUS)	RXROT	←	←						
	MASK	←	←						
	RXDLY2	RXDLY3	←						
	OFFSET1	OFFSET2	←						
	594H	←	←						
EP-3463* (VBPF & GAIN CONT)	6312B	←	←						
EP-3464* (TX TRIGGER GENE)	LCDLY1	LCDLY2	←						
	GEUAD2	GEUAD3	←						
	EMASK	←	←						
	TXROT	←	←						
EP-3465**B, C**	CVN6	▨	▨						
(GEU TIMING & ADRS)	CADR	▨	▨						
(~VER. 6.1)	DF6	▨	▨						
	TIM6	▨	▨						
	MODE6	▨	▨						
	6511S	▨	▨						
EP-3465**D** (GEU TIMING & ADRS)	▨	DCADR	←						
(VER. 6.2~)	▨	TIM61	←						
	▨	DCVN61	←						
	▨	MODE62	←						
	▨	DF62	←						
	▨	657E	←						
	▨	658G	←						
	▨	6510C	←						
EP-3452* (RX SELECT CONT)	SEL	←	←						

HISTORY OF SSD-680STD (Hardware ROM in the DSC unit, 1/4)

(— : not mounted, ← : same as left, ▩ : not exist)

	Version	Ver. 6.1	Ver. 6.2	Ver. 6.3						
PCB	S/N	21M08243~ 08262	31M01326~ 01335	31M01336~ 01345						
EP-3247*	(B/W MEMORY)	BUD1	←	←						
		BUD2	←	←						
		BUD1	←	←						
		BUD2	←	←						
EP-3236*	(DSC ADDRESS)	368L	←	←						
		368D	←	←						
		362KA	←	←						
		361JA	←	←						
EP-3620*	(DSC TIMING)	VTM	←	←						
	For NTSC	HTM	←	←						
		HIP	←	←						
		LEP	←	←						
		REP	←	←						
	For PAL	VTM	←	←						
		PHTM	←	←						
		HIP	←	←						
		LEP	←	←						
		REP	←	←						
EP-2729*	(AD,DA)	GMA68	←	←						
EP-2629*	(AGDC)	CG1B	←	←						
		CG2B	←	←						
		2912A2	←	←						

HISTORY OF SSD-680STD (Hardware ROM in the DSC unit, 2/4)

(— : not mounted, ← : same as left, ▨ : not exist)

PCB \ Version	Ver. 6.1	Ver. 6.2	Ver. 6.3						
S/N	21M08243~ 08262	31M01326~ 01335	31M01336~ 01345						
EP-3477* (US ITF)									
For NTSC	OFS	←	←						
	CY0L	CY0L1	←						
	X0L	X0L1	←						
	MDXY	MDXY1	←						
	CDXY	CDXY1	←						
	CY0H	CY0H1	←						
	X0H	X0H1	←						
	778G	←	←						
	776G	←	←						
	776B	←	←						
For PAL	POFS	←	←						
	CY0L	CY0L1	←						
	PX0L	PX0L1	←						
	PMDXY	PMDXY1	←						
	PCDXY	PCDXY1	←						
	CY0H	CY0H1	←						
	PX0H	PX0H1	←						
	778G	←	←						
	776G	←	←						
	776B	←	←						
EP-2651* (COLOR D/A)	COLMD	←	←						

HISTORY OF SSD-680STD (Hardware ROM in the DSC unit, 3/4)

(— : not mounted, ← : same as left, ▨ : not exist)

Version		Ver. 6.1	Ver. 6.2	Ver. 6.3						
PCB	S/N	21M08243~ 08262	31M01326~ 01335	31M01336~ 01345						
EP-5100C	(COLOR FLOW	008	←	←						
	PROCESSOR)	0019	←	←						
		0038	←	←						
		0044	←	←						
		0049	←	←						
		0068	←	←						
		0069	←	←						
		0070	←	←						
		0071	←	←						
		0072	←	←						
		00117	←	←						
EP-3115*	(COLOR LINE	VEUPD1	←	←						
	BUFFER)	VEUPD1	←	←						
		VAUPD1	←	←						
		VAUPD1	←	←						
EP-3114*	(COLOR POST	148H	←	←						
	PROCESS)	148G	148GA	←						
		148F	148FA	←						
		148C	148CA	←						
		147H	147HA	←						
		147G	147GA	←						
		147D	147DA	←						
		145L	←	←						
		144L	←	←						

HISTORY OF SSD-680STD (Hardware ROM in the DSC unit, 4/4)

(— : not mounted, ← : same as left, ▩ : not exist)

Version	Ver. 6.1	Ver. 6.2	Ver. 6.3						
PCB S/N	21M08243~ 08262	31M01326~ 01335	31M01336~ 01345						
EP-3114* (COLOR POST PROCESS)	144J	←	←						
	143P	←	←						
	143L	←	←						
	141N	←	←						
	141K	←	←						
	141J	←	←						

HISTORY OF SSD-680STD (Hardware ROM in the Doppler unit)

(— : not mounted, ← : same as left, ▨ : not exist)

Version / PCB	Ver. 6.1	Ver. 6.2	Ver. 6.3						
S/N	21M08243~ 08262	31M01326~ 01335	31M01336~ 01345						
EP-2810* (DOP CONTROLLER)	M2006-1.0-1	←	←						
EP-3259* (DOP FILTER)	DM2-AGC-V1.0	←	←						
	T112D	←	←						
	C113D	←	←						
CDC-522A (FFT board)	DZMD124	←	←						
	DZMD125	←	←						
CDG-266A1 (OUTPUT board)	DZMD126	←	←						
	DZMD127A	←	←						

HISTORY OF SSD-680STD (Specification change list)

LEVEL	Specification change (except probe connection)
Ver. 6.1 (21M08243~08262)	• Initial lot
Ver. 6.2 (31M01326~01335)	• The image quality improvement. (correction of the uneven sensitivity on the B/W image when using UST-959-3.5, 960-5, 577-7.5, 5817-5, 967-5, 964P-5.) • Addition of the new PRESET item. (B/W POWER added to IMAGE CONTROL in the PRESET function.) • The following problems were solved. 1. Panel lock up problem that is occurred by the cursor movement when chosen the annotation of the PRESET function. (Occurred on the NTSC system only) 2. Panel lock up problem that is occurred by the cursor movement when chosen the measurement of the PRESET function. (Occurred on the NTSC system only) 3. The contents of initial setting of FLOW AVERAGE differ in compliance with the number of PRESET. 4. The velocity range at the start is different from one which was set by FLOW in the PRESET function. 5. Malfunction of the PRESET for mode and body mark. 6. The image of slant scanning remains after changing the probe to others in case of the PRESET is performed at a state of slant scanning mode. 7. The image is disappeared during the flow area is moving under the slant scanning of UST-5525-7.5. 8. The flow area display mark doesn't show the correct position of that. 9. A wrong image is displayed at the store memory where the image was stored by the following order (FREEZE→CINE→STORE→FREEZE→NEW PAT→NEW PAT→FREEZE→CINE→STORE). (Occurred on the NTSC system only) 10. The message of the "IMAGE STORE" is still displayed after changing the mode from STORE to REVIEW. 11. Wrong velocity range data is displayed when using the independent probe. 12. Wrong image is displayed under the ECG SYNC function. (it's displaying a image which was taken at one beat before) 13. Data of MAX VEL display is wrong when B/F/DOP mode. 14. Scale mark at MAG. 1.5 when using UST-5518-7.5 doesn't display the correct scale. (Occurred on the PAL system only) 15. B mode image is disappeared (should be still at ECG timing) under the condition of B/DOP mode and ECG SYNC. 16. The only one frame of color image is displayed under the condition of FLOW AVERAGE HIGH in the ECG SYNC function. 17. Bottom end of B/W image is notched (should be a curved line or line). 18. The image is expanded by 5 % in lateral direction at MAG. × 1 when using UST-5042-3.5 or 5043P-3.5. 19. The ellipse calculation error of the OB measurement on PAL systems. • The following operation was improved. 1. The halt time of color frame correlation is shorten to about 0.5 sec.. and the color frame interpolation is not prohibited when the flow area moving or mode switching. 2. The PRESET item "VEL RANGE" was deleted from PRESET PW. 3. The contents of "VEL RANGE" in FLOW of PRESET was changed as below. VEL RANGE 0.7K 1.2K 1.5K 2K 4K VELOCITY 2 3 4 5 6 MODE 3K(×4) 5K(×4) 6K(×4) 4K(×2) 4K(×1) 4. The Doppler sampling mark maintain its position when the mode is changed to Doppler active in the B or B/FLOW mode 5. When the mode is B/*/DOP, The transmitting focus point is determined by the panel setting (not by the Doppler sampling position). In case of the receiving focus, it follows the Doppler sampling position as before.

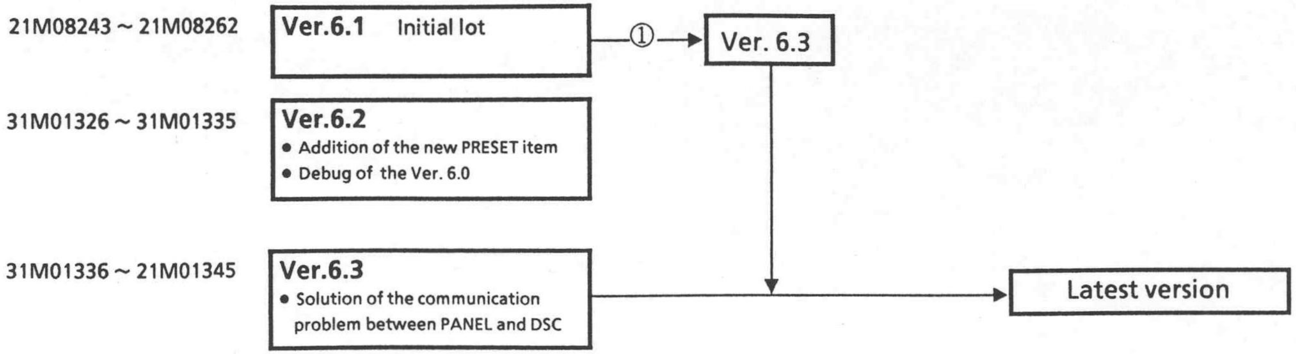
HISTORY OF SSD-680STD (Specification change list)

LEVEL	Specification change (except probe connection)
	6. The B/* image is always still regardless of the velocity range when the mode is selected to DOP active by SELECT switch in the B/*/DOP mode. When changing the velocity range in B/*/DOP mode without pushing SELECT switch, it will be a still B image (in the HPRF condition) or B/*/DOP simultaneous active image depending on the velocity range. 7. The Doppler sampling mark was changed to =. 8. The data of initial setting of FLOW PRESET was changed. 9. The display way of the color flow area for linear probe was changed from a line to a dotted line.
Ver. 6.3 (31M01336~01345)	• The DSC is rarely locked up when power on due to communication trouble between panel and DSC. (M0-680-1-6.2-1 → M0-680-1-6.3-1)

SSD-680STD Upgrade / Modification Kit (S/N ⇆ Version ⇆ Upgrade kit)

S/N	21M08243~21M08262	31M01326~31M01335	31M01336~31M01345		
Version	6.1	6.2	6.3		
Contents of the main change Upgrade/Modification Kit	Initial lot	• Improvement of the B/W image sensitivity problem. • Addition of the new PRESET item. • Debug of the problem on version 6.0.	• Solution of the comunication problem between PANEL and DSC. (Refer to the specification change list)		
PM-680STD-1 (Not exist)					
PM-680STD-2 (Ver.6.1→Ver. 6.2 version up kit for PAL)	All systems of version 6.1 can be upgraded by PM-680STD-2.	PM-680STD-2 are performed at factory on the systems from S/N. 31M01326.			
PM-680STD-3 (Image quality improvement kit)	The affected S/N. is 21M08243~21M08261	PM-680STD-3 is performed at factory on the systems from S/N. 21M08262.			

SSD-680STD Upgrade / Modification kit (S/N ⇆ Software Version ⇆ Upgrade kit)


21M08243 ~ 21M08262
Ver.6.1 Initial lot
①
Ver. 6.3
31M01326 ~ 31M01335
Ver.6.2
• Addition of the new PRESET item
• Debug of the Ver. 6.0
31M01336 ~ 21M01345
Ver.6.3
• Solution of the communication problem between PANEL and DSC
Latest version

Version # in the ☐ shows the original version # when it shipped.

	Number of kit	Note	Number of Technical Bulletin
①	PM-680STD-2 (For PAL)	Ver. 6.1 →Ver. 6.3	
②			
③			
④			
⑤			
⑥			
⑦			

For export

HISTORY OF SSD-680EX

S/N 21M08463~31M11753

HI - 1802

Revision 3

19 - Oct. -1995

Edited by Aloka ME Service Center		
Approved by	Checked by	Written by
K. Kozuka 19 Oct. '95	K. Nakashima 19 -Oct- '95	K. Edamoto 19 -Oct.-'95

Caution

The purpose of this document is maintenance only.
Do not use this for other purpose.

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HISTORY OF SSD-680EX for export (STANDARD UNIT)

← : One directional interchangeability ⇆ : Bi-directional interchangeability ≠ : No interchangeability

Version	6.0	6.0	6.0	6.0	6.2	6.4	6.3	6.4	7.1	
S/N	21M08463~ 08482	21M08483~ 08512	21M10986~ 11035	21M12644~ 12683	31M00876~ 00925	31M01326~ 01345	31M01879~ 01928	31M03899~ 03928	31M11719~ 11753	
MAIN BODY	PSC-118									
TX/RX unit	GEU-64									
DSC unit	UIM-325									
DOPPLER unit (UGR-680EX)	FFA-18B					FFA-18C ←★14				
Power supply unit	PSU-S680B			PSU-S680C ⇆★1 (Except 21M12659, 12661~12663, 12666 which have PSU-S680B)						
Isolation Trans.	PTU-004									
Color TV monitor NTSC	IPC-1230W									
Color TV monitor PAL	IPC-1230WV									
Color TV monitor NTSC	IPC-1010									
Color TV monitor PAL	IPC-1010V									

* : Correction of artwork

HISTORY OF SSD-680EX for export (PSC-118* Main body PCB)

← : One directional interchangeability ⇆ : Bi-directional interchangeability ≠ : No interchangeability

Version	6.0	6.0	6.0	6.0	6.2	6.4	6.3	6.4	7.1	
S/N	21M08463~ 08482	21M08483~ 08512	21M10986~ 11035	21M12644~ 12683	31M00876~ 00925	31M01326~ 01345	31M01879~ 01928	31M03899~ 03928	31M11719~ 11753	
MAIN CONTROL	EP-3265B-3									
MAIN PANEL	L-KEY-19D									
BLIND PANEL	EP-2512B-1									
POWER LAMP	EP-3143									
HEAD PHONE JACK	EP-2510					EP-2510-1 ← ★14				
Full Key board	L-KEY-26									

* : Correction of artwork

HISTORY OF SSD-680EX for export (GEU-64* TX / RX unit PCB)

← : One directional interchangeability ⇆ : Bi-directional interchangeability ≠ : No interchangeability

Version	6.0	6.0	6.0	6.0	6.2	6.4	6.3	6.4	7.1	
S/N	21M08463~ 08482	21M08483~ 08512	21M10986~ 11035	21M12644~ 12683	31M00876~ 00925	31M01326~ 01345	31M01879~ 01928	31M03899~ 03928	31M11719~ 11753	
PROBE SELECT RELAY (2sets)	EP-3453-1~4									
PROBE SELECTOR	EP-3454B									
RX SELECT	EP-3455C									
TX 1	EP-3456									
TX 2	EP-3457									
Pre AMP	EP-3458B								EP-3458C ← ★18	
RX FOCUS (2 PCBs)	EP-3459B				EP-3459C ← ★10				EP-3459D ← ★19	
MAIN AMP & COLOR ITF	EP-3461B-1				EP-3461C-1 ← ★11	EP-3461D-1 ← ★15			EP-3461E-1 ← ★20	
VBPF & GAIN CONTROL	EP-3463				EP-3463 ← ★12				EP-3463B ⇆ ★21	
TX TRIGGER GENE	EP-3464B			EP-3464C ← ★2					EP-3464D ← ★22	
GEU TIMING & ADDRESS	EP-3465B			EP-3465C ← ★3	EP-3465D ← ★4				EP-3465E ← ★23	
GEU INTERFACE	EP-3525B									
RX SELECT CONT	EP-3452									
MOTHER BOARD	EP-3466B								EP-3466C ← ★24	

* : Correction of artwork

HISTORY OF SSD-680EX for export (UIM-325* DSC unit PCB, 1/2)

← : One directional interchangeability ⇆ : Bi-directional interchangeability ≠ : No interchangeability

Version	6.0	6.0	6.0	6.0	6.2	6.4	6.3	6.4	7.1	
S/N	21M08463~ 08482	21M08483~ 08512	21M10986~ 11035	21M12644~ 12683	31M00876~ 00925	31M01326~ 01345	31M01879~ 01928	31M03899~ 03928	31M11719~ 11753	
B/W MEMORY	EP-3247B									
DSC ADDRESS	EP-3236E								EP-3236F ←* ★25	
DSC TIMING (NTSC)	EP-3620-1									
DSC TIMING (PAL)	EP-3620-2									
A/D, D/A	EP-2729H-7								EP-2729F-9 ←★26	
DUAL MPU	EP-2913B-1								EP-2913B-2 ≠ ★27	
AGDC	EP-2629D									
US ITF (NTSC)	EP-3477B-1		EP-3477C-1 21M11001, 21M11011~ ← ★5							
US ITF (PAL)	EP-3477B-2		EP-3477C-2 21M11001, 21M11011~ ← ★5							
COLOR D/A	EP-2651E-4								EP-2651E-5 ←★28	
FOOT SW CONNECTOR	EP-2700									
SVHS CONNECTOR	EP-3179									
B/W CINE MEMORY	EP-3237B									
COLOR FLOW PROCESSOR	EP-5100B			EP-5100C ←* ★6					EP-5100D ←★29	
COLOR LINE BUFFER	EP-3115E									

* : Correction of artwork

HISTORY OF SSD-680EX for export (UIM-325* DSC unit PCB, 2/2)

← : One directional interchangeability ⇆ : Bi-directional interchangeability ≠ : No interchangeability

Version	6.0	6.0	6.0	6.0	6.2	6.4	6.3	6.4	7.1	
S/N	21M08463~ 08482	21M08483~ 08512	21M10986~ 11035	21M12644~ 12683	31M00876~ 00925	31M01326~ 01345	31M01879~ 01928	31M03899~ 03928	31M11719~ 11753	
COLOR POST PROCESS	EP-3114E									
COLOR MEMORY VEL	EP-2213B									
COLOR MEMORY VAR	EP-2213B-1									
COLOR CINE MEMORY	EP-3238									
VIDEO ITF (NTSC)	EP-3443 B-1 EP-3443B-5 ← ★ 16 21M08466~	EP-3443C-5 ← ★ 17 21M08483~				EP-3443C-15 ← ★13				
VIDEO ITF (PAL)	EP-3443 B-2 EP-3443B-6 ← ★ 16 21M08466~	EP-3443C-6 ← ★ 17 21M08483~				EP-3443C-16 ← ★13				
MOTHER BOARD	EP-3467B			EP-3467D ← ★7						

* : Correction of artwork

HISTORY OF SSD-680EX for export (FFA-18∗ Doppler unit PCB)

← : One directional interchangeability ⇆ : Bi-directional interchangeability ≠ : No interchangeability

Version	6.0	6.0	6.0	6.0	6.2	6.4	6.3	6.4	7.1	
S/N	21M08463~ 08482	21M08483~ 08512	21M10986~ 11035	21M12644~ 12683	31M00876~ 00925	31M01326~ 01345	31M01879~ 01928	31M03899~ 03928	31M11719~ 11753	
DOP TXRX	EP-3260B								EP-3260C ≠ ★30	
DOP CONTROLLER	EP-2810B-3		EP-2810B-4 21M11001, 21M11011~ ← ★8							
DOP FILTER	EP-3259C									
DOP INTERFACE	EP-2812B					EP-2812B-1 ← ★14				
FFT BOARD	Frequency analyzer (NJK-196A) made by JRC									
OUTPUT BOARD										
MOTHER BOARD	EP-2808									

∗ : Correction of artwork

HISTORY OF SSD-680EX for export (PEU-680* Optional ECG display unit PCB)

← : One directional interchangeability ⇆ : Bi-directional interchangeability ≠ : No interchangeability

S/N of PEU-680*	31M01484~ 01493	31M08027~ 08046								
ECG signal display unit	PEU-680B ★9									
ECG SIGNAL UNIT	EU-5026									
PHYSIO AMP	EP-3117C									
ECG PANEL	L-KEY-8B									
ECG MEMORY (in DSC unit)	EP-2841C									

* : Correction of artwork

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HISTORY OF SSD-680EX

(Explanation of ★ mark)

No.	Explanation of ★ mark	Note
★ 1	PSU-S680B······ Power supply unit for SSD-680EX/STD which is a modified SSD-680 power supply unit. PSU-S680C······ New power supply unit which is designed for SSD-680EX/STD. Both types of power supply unit are electrically and mechanically identical.	PSU-S680B→PSU-S680C
★ 2	Improvement for noise problem that appeared near the transmitting wave signal on the image of B/FLOW or B/*/D at minimum transmitting power.	EP-3464B→EP-3464C
★ 3	Improvement for lateral line color noise problem that appeared on the image when using 5MHz or 7.5MHz probe. (It occurred on five systems out of 15 when using EP-5100C.	EP-3465B→EP-3465C
★ 4	Improvement for the ECG SYNC problem. Correction of the artwork.	EP-3465C→EP-3465D
★ 5	Improvement for an unnecessary display.	EP-3477B-1→EP-3477C-1, EP-3477B-2→EP-3477C-2
★ 6	Improvement for the display method of strong color signal. Addition of the Spacial Filter function for the variance. Color noise reduction (improvement of the dynamic range)	EP-5100B→C
★ 7	Improvement of the external video signal switching problem. Improvement of the EXT B/W OUT problem.	EP-3467B→D
★ 8	Improvement of the FFT malfunction.	EP-2810B-3→B-4
★ 9	PEU-680B is a ECG signal display unit for SSD-680EX/STD. (PEU-680 is for only SSD-680.) PEU-680B = PEU-680 + CABLE4 + CABLE 34	PEU-680→680B
★ 10	Improvement of the RX DELAY noise (slanting).	EP-3459B→C
★ 11	Improvement of the frequency characteristic.	EP-3461B-1→C-1
★ 12	Improvement of the lateral arc line noise (by changing the wiring only). Therefore, no suffix change.	
★ 13	Improvement of the vertical striped noise when using SSZ-305.	EP-3443C-5→C-15 EP-3443C-6→C-16
★ 14	Improvement of the EMI.	EP-2510→-1, EP-2812B→B-1
★ 15	Improvement of the image quality (by changing the buffer amp.).	EP-3461C-1→D-1
★ 16	Improvement of the frequency characteristic of the video signal.	EP-3443B-1→B-5, EP-3443B-2→B-6
★ 17	Part change 2SC503 (Q1, Q2, Q3, Q9) to 2SC2235. Elimination of the parts (C251, 253, 255).	EP-3443B-5→C-5, EP-3443B-6→C-6

01

HISTORY OF SSD-680EX (Probe Connection)

Model	TYPE	Note	Software Version ○ : connectable × : unconnectable △: see note																						
			6.0	6.2	6.3																				
UST-958-7.5	C		○	○	○																				
UST-959-3.5	C		○	○	○																				
UST-960-5	C		○	○	○																				
UST-961-5	C		○	○	○																				
UST-961-7.5	C		○	○	○																				
UST-962-5	C		○	○	○																				
UST-964P-5	C		○	○	○																				
UST-965-3.5	C		○	○	○																				
UST-966-3.5	C		○	○	○																				
UST-967-5	C		○	○	○																				
UST-968P-5	C		○	○	○																				
UST-969-5	C		○	○	○																				
UST-970-7.5	C		○	○	○																				
UST-667P-5	C		○	○	○																				
UST-5042-3.5	L		○	○	○																				
UST-5043P-3.5	L		○	○	○																				
UST-5518-7.5	L		○	○	○																				
UST-5525-7.5	L	Steerable linear	○	○	○																				
UST-5817-5	L		○	○	○																				
UST-576T-7.5	L		○	○	○																				
UST-577-7.5	L		○	○	○																				
UST-5523-7.5	L		○	○	○																				
UST-666-5/7.5	B		○	○	○																				
UST-2262-2	IC		○	○	○																				

▸TYPE : A: Annular array, B: Biplane, C: Convex sector, I: Independent, L: Linear array, M: Mechanical sector, P: Phased array sector, R: Radial, S: Single element
SC: Steerable CW doppler, IC: Indipendent CW doppler

Caution Be noted that the probe connectability information is solely based upon the engineering stand point.

HISTORY OF SSD-680EX for export (Software ROM)

(— : not mounted, ← : same as left, ▨ : not exist)

Version	Ver. 6.0	Ver. 6.0	Ver. 6.0	Ver. 6.0	Ver. 6.2	Ver. 6.3	Ver.6.4	Ver.6.4	Ver.7.1
PCB S/N	21M08463~ 08482	21M08483~ 08512	21M10986~ 11035	21M12644~ 12683	31M00876~ 00925	31M01879~ 01928	31M01326~ 01345	31M03899~ 03928	31M11719~ 11753
EP-3265* PANEL For NTSC & PAL	M0680-1-6.0-1	←	←	←	M0680-1-6.2-1	M0680-1-6.3-1	M0680-1-6.4-1	←	M0680-1-7.1-1
	M0680-1-6.0-2	←	←	←	M0680-1-6.2-2	M0680-1-6.3-2	M0680-1-6.4-2	←	M0680-1-7.1-2
	M0680-1-6.0-3	←	←	←	M0680-1-6.2-3	M0680-1-6.3-3	M0680-1-6.4-3	←	M0680-1-7.1-3
	M0680-1-6.0-4	←	←	←	M0680-1-6.2-4	M0680-1-6.3-4	M0680-1-6.4-4	←	M0680-1-7.1-4
EP-2913* DSC For NTSC	M0680-2-6.0-1	←	←	←	M0680-2-6.2-1	←	←	←	M0680-2-7.1-1
	M0680-2-6.0-2	←	←	←	M0680-2-6.2-2	←	←	←	M0680-2-7.1-2
	M0680-2-6.0-3	←	←	←	M0680-2-6.2-3	←	←	←	M0680-2-7.1-3
For PAL	M0680-2u-6.0-1	←	←	←	M0680-2u-6.2-1	←	←	←	M0680-2u-7.1-1
	M0680-2u-6.0-2	←	←	←	M0680-2u-6.2-2	←	←	←	M0680-2u-7.1-2
	M0680-2u-6.0-3	←	←	←	M0680-2u-6.2-3	←	←	←	M0680-2u-7.1-3
MEASUREMENT	M3002-0U-4.0d-1	←	←	←	←	←	←	←	M3002-0X-1.0-1
For NTSC	M3002-0U-4.0d-2	←	←	←	←	←	←	←	M3002-0X-1.0-2
	M3002-0U-4.0d-3	←	←	←	←	←	←	←	M3002-0X-1.0-3
	▨	▨	▨	▨	▨	▨	▨	▨	M3002-0X-1.0-4
For PAL	M3002-0V-2.0d-1	←	←	←	←	←	←	←	M3002-0Y-1.0-1
	M3002-0V-2.0d-2	←	←	←	←	←	←	←	M3002-0Y-1.0-2
	M3002-0V-2.0d-3	←	←	←	←	←	←	←	M3002-0Y-1.0-3
	▨	▨	▨	▨	▨	▨	▨	▨	M3002-0Y-1.0-4
EP-2629* GDC For NTSC & PAL	M1010-4.0a-1	←	←	←	←	←	←	←	←
	M1010-4.0a-2	←	←	←	←	←	←	←	←
EP-2810* DOP CONTROLLER	M2006-1.0-1	←	←	←	←	←	←	←	←
For NTSC & PAL	M2006-1.0-2	←	←	←	←	←	←	←	←

HISTORY OF SSD-680EX for export (Hardware ROM in the TX / RX unit)

(— : not mounted, ← : same as left, ▨ : not exit)

Version / PCB S/N	Ver. 6.0	Ver. 6.0	Ver. 6.0	Ver. 6.0	Ver. 6.2	Ver. 6.3	Ver.6.4	Ver.6.4	Ver.7.1
	21M08463~ 08482	21M08483~ 08512	21M10986~ 11035	21M12644~ 12683	31M00876~ 00925	31M01879~ 01928	31M01326~ 01345	31M03899~ 03928	31M11719~ 11753
EP-3459* (RX FOCUS)	RXROT	←	←	←	←	←	←	←	←
	MASK	←	←	←	←	←	←	←	←
	RXDLY1	RXDLY2	←	←	RXDLY3	←	←	←	RXDLY4
	OFFSET1	←	←	←	OFFSET2	←	←	←	OFFSET3
	594H	←	←	←	←	←	←	←	←
EP-3463* (VBPF & GAIN CONT)	6312B	←	←	←	←	←	←	←	←
EP-3464* (TX TRIGGER GENE)	LCDLY1	←	←	←	LCDLY2	←	←	←	LCDLY3
	GEUAD1	GEUAD2	←	←	GEUAD3	←	←	←	GEUAD4
	EMASK	←	←	←	←	←	←	←	EMASK1
	TXROT	←	←	←	←	←	←	←	←
EP-3465**B, C**	CVN6	←	←	←	▨	▨	▨	▨	(CVN6/7)
(GEU TIMING & ADRS)	CADR	←	←	←	▨	▨	▨	▨	(CADR/7)
(~VER. 6.0)	DF6	←	←	←	▨	▨	▨	▨	(DF7)
	TIM6	←	←	←	▨	▨	▨	▨	(TIM6/7)
	MODE6	←	←	←	▨	▨	▨	▨	(MODE7)
	6511S	←	←	←	▨	▨	▨	▨	(6511S)
EP-3465**D, E**	▨	▨	▨	▨	DCADR	←	←	←	←
(GEU TIMING & ADRS)	▨	▨	▨	▨	TIM61	←	←	←	TIM7
(VER. 6.2~)	▨	▨	▨	▨	DCVN61	←	←	←	←
	▨	▨	▨	▨	MODE62	←	←	←	MODE7
	▨	▨	▨	▨	DF62	←	←	←	DF7
	▨	▨	▨	▨	657E	←	←	←	←
	▨	▨	▨	▨	658G	←	←	←	←
	▨	▨	▨	▨	6510C	←	←	←	←
EP-3452* (RX SELECT CONT)	SEL	←	←	←	←	←	←	←	←

It is ROM No., as using PM-680EX-5/6.
PCB No. is EP-3465**d**.

HISTORY OF SSD-680EX for export (Hardware ROM in the DSC unit, 1/4)

(— : not mounted, ← : same as left, ▨ : not exist)

Version	Ver. 6.0	Ver. 6.0	Ver. 6.0	Ver. 6.0	Ver. 6.2	Ver. 6.3	Ver.6.4	Ver.6.4	Ver.7.1
PCB S/N	21M08463~ 08482	21M08483~ 08512	21M10986~ 11035	21M12644~ 12683	31M00876~ 00925	31M01879~ 01928	31M01326~ 01345	31M03899~ 03928	31M11719~ 11753
EP-3247* (B/W MEMORY)	BUD1	←	←	←	←	←	←	←	BUD1B
	BUD2	←	←	←	←	←	←	←	BUD2B
	BUD1	←	←	←	←	←	←	←	BUD1B
	BUD2	←	←	←	←	←	←	←	BUD2B
EP-3236**E** (DSC ADDRESS)	368L	←	←	←	←	←	←	←	▨
	368D	←	←	←	←	←	←	←	▨
	362KA	←	←	←	←	←	←	←	▨
	361JA	←	←	←	←	←	←	←	▨
EP-3236**F** (DSC ADDRESS)	▨	▨	▨	▨	▨	▨	▨	▨	368M
	▨	▨	▨	▨	▨	▨	▨	▨	368D
	▨	▨	▨	▨	▨	▨	▨	▨	362L
	▨	▨	▨	▨	▨	▨	▨	▨	361K
EP-3620* (DSC TIMING)	VTM	←	←	←	←	←	←	←	←
For NTSC	HTM	←	←	←	←	←	←	←	←
	HIP	←	←	←	←	←	←	←	←
	LEP	←	←	←	←	←	←	←	←
	REP	←	←	←	←	←	←	←	←
For PAL	VTM	←	←	←	←	←	←	←	←
	PHTM	←	←	←	←	←	←	←	←
	HIP	←	←	←	←	←	←	←	←
	LEP	←	←	←	←	←	←	←	←
	REP	←	←	←	←	←	←	←	←
EP-2729* (AD,DA)	GMA68	←	←	←	←	←	←	←	←

HISTORY OF SSD-680EX for export (Hardware ROM in the DSC unit, 2/4)

(— : not mounted, ← : same as left, ▨ : not exist)

PCB		Version	Ver. 6.0	Ver. 6.0	Ver. 6.0	Ver. 6.0	Ver. 6.2	Ver. 6.3	Ver.6.4	Ver.6.4	Ver.7.1
		S/N	21M08463~ 08482	21M08483~ 08512	21M10986~ 11035	21M12644~ 12683	31M00876~ 00925	31M01879~ 01928	31M01326~ 01345	31M03899~ 03928	31M11719~ 11753
EP-2629*	(AGDC)		CG1B	←	←	←	←	←	←	←	CG1C
			CG2B	←	←	←	←	←	←	←	CG2C
			2912A2	←	←	←	←	←	←	←	←
EP-3477*	(US ITF)		OFS	←	←	←	←	←	←	←	OFS1
	For NTSC		CY0L	←	←	←	CY0L1	←	←	←	CY0L3
			X0L	←	←	←	X0L1	←	←	←	X0L3
			MDXY	←	←	←	MDXY1	←	←	←	MDXY2
			CDXY	←	←	←	CDXY1	←	←	←	CDXY3
			CY0H	←	←	←	CY0H1	←	←	←	CY0H3
			X0H	←	←	←	X0H1	←	←	←	X0H3
			778G	←	←	←	←	←	←	←	←
			776G	←	←	←	←	←	←	←	←
			776B	←	←	←	←	←	←	←	←
	For PAL		POFS	←	←	←	←	←	←	←	POFS1
			CY0L	←	←	←	CY0L1	←	←	←	CY0L3
			PX0L	←	←	←	PX0L1	←	←	←	PX0L3
			PMDXY	←	←	←	PMDXY1	←	←	←	PMDXY2
			PCDXY	←	←	←	PCDXY1	←	←	←	PCDXY3
			CY0H	←	←	←	CY0H1	←	←	←	CY0H3
			PX0H	←	←	←	PX0H1	←	←	←	PX0H3
			778G	←	←	←	←	←	←	←	←
			776G	←	←	←	←	←	←	←	←
			776B	←	←	←	←	←	←	←	←
EP-2651*	(COLOR D/A)		COLMD	←	←	←	←	←	←	←	←

HISTORY OF SSD-680EX for export (Hardware ROM in the DSC unit, 3/4)

(— : not mounted, ← : same as left, ▨ : not exist)

Version	Ver. 6.0	Ver. 6.0	Ver. 6.0	Ver. 6.0	Ver. 6.2	Ver. 6.3	Ver.6.4	Ver.6.4	Ver.7.1
PCB S/N	21M08463~ 08482	21M08483~ 08512	21M10986~ 11035	21M12644~ 12683	31M00876~ 00925	31M01879~ 01928	31M01326~ 01345	31M03899~ 03928	31M11719~ 11753
EP-5100**B** (COLOR FLOW	008	←	←	▨	▨	▨	▨	▨	▨
PROCESSOR)	0019	←	←	▨	▨	▨	▨	▨	▨
	0038	←	←	▨	▨	▨	▨	▨	▨
	0044	←	←	▨	▨	▨	▨	▨	▨
	0049	←	←	▨	▨	▨	▨	▨	▨
	0068	←	←	▨	▨	▨	▨	▨	▨
	0069	←	←	▨	▨	▨	▨	▨	▨
	0070	←	←	▨	▨	▨	▨	▨	▨
	0071	←	←	▨	▨	▨	▨	▨	▨
	0072	←	←	▨	▨	▨	▨	▨	▨
	00117	←	←	▨	▨	▨	▨	▨	▨
EP-5100**C** (COLOR FLOW	▨	▨	▨	0018b	←	←	←	←	▨
PROCESSOR)	▨	▨	▨	0032b	←	←	←	←	▨
	▨	▨	▨	0060b	←	←	←	←	▨
	▨	▨	▨	0096b	←	←	←	←	▨
	▨	▨	▨	0049b	←	←	←	←	▨
	▨	▨	▨	0069b	←	←	←	←	▨
EP-5100**D** (COLOR FLOW	▨	▨	▨	▨	▨	▨	▨	▨	002LA
PROCESSOR)	▨	▨	▨	▨	▨	▨	▨	▨	008LA
	▨	▨	▨	▨	▨	▨	▨	▨	006QA
	▨	▨	▨	▨	▨	▨	▨	▨	0010EA
	▨	▨	▨	▨	▨	▨	▨	▨	009HA
	▨	▨	▨	▨	▨	▨	▨	▨	002FA
	▨	▨	▨	▨	▨	▨	▨	▨	002GA
	▨	▨	▨	▨	▨	▨	▨	▨	0011QA
	▨	▨	▨	▨	▨	▨	▨	▨	0011RA
	▨	▨	▨	▨	▨	▨	▨	▨	002NA

HISTORY OF SSD-680EX for export

(Hardware ROM in the DSC unit, 4/4)

(— : not mounted, ← : same as left, ▨ : not exist)

Version	Ver. 6.0	Ver. 6.0	Ver. 6.0	Ver. 6.0	Ver. 6.2	Ver. 6.3	Ver.6.4	Ver.6.4	Ver.7.1
PCB S/N	21M08463~ 08482	21M08483~ 08512	21M10986~ 11035	21M12644~ 12683	31M00876~ 00925	31M01879~ 01928	31M01326~ 01345	31M03899~ 03928	31M11719~ 11753
EP-3115* (COLOR LINE	VEUPD1	←	←	←	←	←	←	←	VEUPD2
BUFFER)	VEUPD1	←	←	←	←	←	←	←	VEUPD2
	VAUPD1	←	←	←	←	←	←	←	←
	VAUPD1	←	←	←	←	←	←	←	←
EP-3114* (COLOR POST	148H	←	←	←	←	←	←	←	←
PROCESS)	148G	←	←	←	148GA	←	←	←	←
	148F	←	←	←	148FA	←	←	←	←
	148C	←	←	←	148CA	←	←	←	←
	147H	←	←	←	147HA	←	←	←	←
	147G	←	←	←	147GA	←	←	←	←
	147D	←	←	←	147DA	←	←	←	←
	145L	←	←	←	←	←	←	←	←
	144L	←	←	←	←	←	←	←	←
	144J	←	←	←	←	←	←	←	←
	143P	←	←	←	←	←	←	←	←
	143L	←	←	←	←	←	←	←	←
	141N	←	←	←	←	←	←	←	←
	141K	←	←	←	←	←	←	←	←
	141J	←	←	←	←	←	←	←	←

HISTORY OF SSD-680EX for export (Hardware ROM in the Doppler unit)

(— : not mounted, ← : same as left, ▨ : not exist)

Version		Ver. 6.0	Ver. 6.0	Ver. 6.0	Ver. 6.0	Ver. 6.2	Ver. 6.3	Ver.6.4	Ver.6.4	Ver.7.1
PCB	S/N	21M08463~ 08482	21M08483~ 08512	21M10986~ 11035	21M12644~ 12683	31M00876~ 00925	31M01879~ 01928	31M01326~ 01345	31M03899~ 03928	31M11719~ 11753
EP-2810*	(DOP CONTROLLER)	M2006-1.0-1	←	←	←	←	←	←	←	←
EP-3259*	(DOP FILTER)	DM2-AGC-V1.0	←	←	←	←	←	←	←	←
		T112D	←	←	←	←	←	←	←	←
		C113D	←	←	←	←	←	←	←	←
CDC-522A	(FFT board)	DZMD124	←	←	←	←	←	←	←	←
		DZMD125	←	←	←	←	←	←	←	←
CDG-266A1	(OUTPUT board)	DZMD126	←	←	←	←	←	←	←	←
		DZMD127A	←	←	←	←	←	←	←	←

HISTORY OF SSD-680EX for export (Specification change list)

LEVEL	Specification change (except probe connection)
Ver. 6.0 (21M08463~12683)	• Initial lot
Ver. 6.1	• This version is not exist on SSD-680EX. (SSD-680STD has this version.)
Ver. 6.2 (31M00876~00925)	• The image quality improvement. (correction of the uneven sensitivity on the B/W image when using UST-959-3.5, 960-5, 577-7.5, 5817-5, 967-5, 964P-5.) • Addition of the new PRESET item. (B/W POWER added to IMAGE CONTROL in the PRESET function.) • The following problems were solved. 1. Panel lock up problem that is occurred by the cursor movement when chosen the annotation of the PRESET function. (Occurred on the NTSC system only) 2. Panel lock up problem that is occurred by the cursor movement when chosen the measurement of the PRESET function. (Occurred on the NTSC system only) 3. The contents of initial setting of FLOW AVERAGE differ in compliance with the number of PRESET. 4. The velocity range at the start is different from one which was set by FLOW in the PRESET function. 5. Malfunction of the PRESET for mode and body mark. 6. The image of slant scanning remains after changing the probe to others in case of the PRESET is performed at a state of slant scanning mode. 7. The image is disappeared during the flow area is moving under the slant scanning of UST-5525-7.5. 8. The flow area display mark doesn't show the correct position of that. 9. A wrong image is displayed at the store memory where the image was stored by the following order (FREEZE→CINE→STORE→FREEZE→NEW PAT→NEW PAT→FREEZE→CINE→STORE). (Occurred on the NTSC system only) 10. The message of the "IMAGE STORE" is still displayed after changing the mode from STORE to REVIEW. 11. Wrong velocity range data is displayed when using the independent probe. 12. Wrong image is displayed under the ECG SYNC function. (it's displaying a image which was taken at one beat before) 13. Data of MAX VEL display is wrong when B/F/DOP mode. 14. Scale mark at MAG. 1.5 when using UST-5518-7.5 doesn't display the correct scale. (Occurred on the PAL system only) 15. B mode image is disappeared (should be still at ECG timing) under the condition of B/DOP mode and ECG SYNC. 16. The only one frame of color image is displayed under the condition of FLOW AVERAGE HIGH in the ECG SYNC function. 17. Bottom end of B/W image is notched (should be a curved line or line). 18. The image is expanded by 5 % in lateral direction at MAG. × 1 when using UST-5042-3.5 or 5043P-3.5. 19. The ellipse calculation error of the OB measurement on PAL systems. • The following operation was improved. 1. The halt time of color frame correlation is shorten to about 0.5 sec.. and the color frame interpolation is not prohibited when the flow area moving or mode switching. 2. The PRESET item "VEL RANGE" was deleted from PRESET PW. 3. The contents of "VEL RANGE" in FLOW of PRESET was changed as below. VEL RANGE 0.7K 1.2K 1.5K 2K 4K VELOCITY 2 3 4 5 6 MODE 3K(×4) 5K(×4) 6K(×4) 4K(×2) 4K(×1) 4. The Doppler sampling mark maintain its position when the mode is changed to Doppler active in the B or B/FLOW mode 5. When the mode is B/*/DOP, The transmitting focus point is determined by the panel setting (not by the Doppler sampling position). In case of the receiving focus, it follows the Doppler sampling position as before.

HISTORY OF SSD-680EX for export (Specification change list)

LEVEL	Specification change (except probe connection)
	6. The B/* image is always still regardless of the velocity range when the mode is selected to DOP active by SELECT switch in the B/*/DOP mode. When changing the velocity range in B/*/DOP mode without pushing SELECT switch, it will be a still B image (in the HPRF condition) or B/*/DOP simultaneous active image depending on the velocity range. 7. The Doppler sampling mark was changed to " = ". 8. The data of initial setting of FLOW PRESET was changed. 9. The display way of the color flow area for linear probe was changed from a line to a dotted line.
Ver. 6.3 (31M01879~01928)	• The DSC is rarely locked up when power on due to communication trouble between panel and DSC. (M0-680-1-6.2-1 → M0-680-1-6.3-1)
Ver. 6.4 (31M01326~01345) (31M03899~03928)	• Solution of the system start up problem once in a while, when power on.
Ver. 7.1 (31M11719~11793)	• The following problems were solved by Ver.7.1. 1. Scrolling method is changed to moving bar method on M mode by the order of "flow→vel ↑ →B|B→select(activate right side)→M ". 2. The order that has "B|B→select→flow→select" change the value of velocity range itself. 3. The function of search doesn't work , changing velocity range from 8kHZ to 6kHZ on DOP mode and freezing the image. 4. The left side of images is not frozen by the order of "M mode→working a cursor →freeze". 5. Focus marks appear on the image area,as using UST-960-5 in 2B mode. 6. you set B/M mode on preset you turn on the equipment. imaging format is B/M mode,but B image doesn't display. 7. As replaying VCR, replaying image disappear as you use MD-POSI/NEGA switch. 8. As using UST-667P-5,the imaging area has lacks. 9. Doppler gain drops itself in B/FLOW/DOP mode as the velocity range is increased and HPRF mode is achieved. 10. If UST-666-5/7.5 or UST-667P-5 is connected,the both edges of the B-mode image are displayed jaggedly. • Improvement of operability. 1. It provides 7 steps of setting magnifications for the UST-959-3.5 and the UST-999-5,and 5 steps for the UST-960-5. 2. Changing scanning width and angle of the black-and-white image . Addition of F-B/W and B-B/W on flow display in flow menu. 3. Addition of AUTO to AREA LOCK in the FLOW menu. 4. Addition of LOW (1:3),MID (1:2), and HIGH (1:1) as sub-menu for LINE DENSITY in the FLOW menu. 5. Addition of an IMG QLT menu for setting the image quality. 6. Addition of a SEC APP menu for the sector probes. 7. Changing a name from FRM-COR to CORR and addition of a line correlation setup. 8. Addition of ZOOM operation in B/DOP mode and B/FLOW/DOP mode. 9. Addition of ECG waves display in 2B mode. 10. Changing the cursor switch operation so that when the cursor switch is changed as follows: B*→B*/DOP→B*. 11. Addition of velocity range of 5kHz. 12. Expanding the upper and lower limits of the flow area when HORI is selected for Color average. 13. Changing the PRESET contents and operation. 14. Changing the frame correlation of black-and-white and color images.

HISTORY OF SSD-680EX for export (Specification change list)

LEVEL	Specification change (except probe connection)
	• Improvement of calculation functions. 1. Addition of bone angle measurements;HIP-J. 2. Addition of left ventricular cardiac function measurements with the A-L method on B-mode;LV-AL. 3. Addition of venous flow volume measurements;F-VOL. 4. Changing the name from PUL-IND to P.I. and from POU-IND to R.I. , and it enable to display results of measurements. 5. Improvement of precision for measurements. 6. Addition of the Campbell and the Hansmann tables to O.B. tables. 7. Changing operation of the O.B. report. 8. Addition of the AUTO-TRACE function. 9. Elimination of the page that make you select fetal weight equation on the O.B. program.

SSD-680EX Upgrade/Modification Kit (S/N⇆Version⇆Upgrade kit)

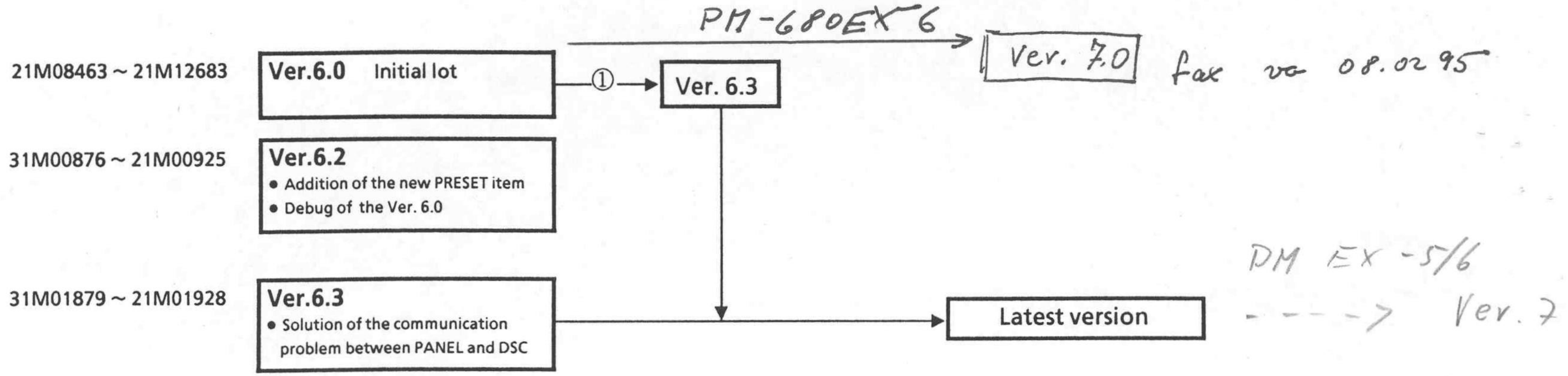
S/N	21M08463~21M12683	31M00876~31M00925	31M01879~31M01928	31M01326~31M01345 31M03899~31M03928	31M11719~31M11753	
Version	6.0	6.2	6.3	6.4	7.1	
Contents of the main change / Upgrade/Modification Kit	Initial lot	● Improvement of the B/W image sensitivity problem. ● Addition of the new PRESET item. ● Debug of the problem on version 6.0.	● Solution of the comunication problem between PANEL and DSC.	● Solution of the system cannot start up once in a while, when you turn the switch ON.	● Improvement of operability. ● Improvement and addition of measuring function. ● Connection of new optional probes.	
PM-680EX-1 (for NTSC) PM-680EX-2 (for PAL) Ver.6.0→Ver. 6.4 version up kit	All systems from version 6.0 to version 6.3 can be upgraded by PM-680EX-1 or 2.			PM-680EX-1or 2 is performed at factory on the systems S/N. 31M01326~31M01345, 31M03899~ .		
PM-680EX-3 B/W Image quality improvement kit	All systems of version 6.0 and 6.2 can be upgraded by PM-680EX-3.		PM-680EX-3 is performed at factory on the systems from S/N. 31M01879.			
PM-680EX-4 Color quality improvement kit See Note 1. PM-680EX-3 should be performed before this	The affected S/N. is 21M08463~21M11035 PM-680EX-4 is performed at factory from S/N 21M12644.					
PM-680EX-5 (for NTSC) PM-680EX-6 (for PAL) Ver.6.0~6.4→Ver. 7.0, 7.1 version up kit Kit does not include the improvement by PM-680EX-7.	All systems from version 6.0 to version 6.4 can be upgraded by PM-680EX-5 or 6.				PM-680EX-5 or 6 is performed at factory on the systems S/N 31M11719~.	
PM-680EX-7 B/W Image Quality Improvement Kit PM-680EX-5 (for NTSC) or PM-680EX-6 (for PAL) should be performed before this.	After using PM-680EX-5 or 6, the systems from version 6.0 to version 6.4 can be upgraded by PM-680EX-7.				PM-680EX-7 is performed at factory on the systems S/N 31M11719~.	
PM-680EX-9 Color quality improvement kit See Note 2. In case of S/N 21M08463~21M11035, PM-680EX-3 should be performed before this.	The affected S/N is 21M08463~31M03928.				PM-680EX-9 is performed at factory on the systems S/N 31M11719~.	

Note1: The purpose of PM-680EX-4 is to add the feature which is changed by Color Flow Processor board EP-5100C, for S/N 21M08463~21M11035.

Note2: The purpose of PM-680EX-9 is to add the feature which is changed by Color Flow Processor board EP-5100D, for S/N 21M08463~31M03928.

r/c

SSD-680EX Upgrade / Modification kit (S/N ⇆ Software Version ⇆ Upgrade kit)


PM-680EX 6
Ver. 7.0
fax vo 08.02 95
21M08463 ~ 21M12683
Ver.6.0 Initial lot
①
Ver. 6.3
31M00876 ~ 21M00925
Ver.6.2
• Addition of the new PRESET item
• Debug of the Ver. 6.0
31M01879 ~ 21M01928
Ver.6.3
• Solution of the communication problem between PANEL and DSC
Latest version
PM EX -5/6
----> Ver. 7

Version # in the ☐ shows the original version # when it shipped.

	Number of kit	Note	Number of Technical Bulletin
①	PM-680EX-1 (For NTSC) PM-680EX-2 (For PAL)	Ver. 6.0 →Ver. 6.3	
②			
③			
④			
⑤			
⑥			
⑦			

8-Feb-95 8:35A

ALOKA Deutschland GmbH
Zentrale Düsseldorf
Büropark Wolfsfeld
Wolfsfeld 5
40670 Meerbusch

Aloka

FAX-TRANSMISION

~~To:~~ From
Mr. Nakayama
ALOKA EUROPE

Date: 08.02.1995
Pages (incl coverpage):
~~from:~~ to H.-G.Rokita
Phone.: 02159/915630
Fax: 02159/915699

2238

Reference: SSD-680EX S/N 21M12679

Good morning dear Nakayama san,
Above mentioned I want to modify the machine from Ver. 6.0 to Ver 7.0.
My opinion is first whe must modify the machine with PM-680EX-2 after that it is possible to built in PM-680EX-5/6.
Please tell my, Is thise proceeding correct?

Thank you in advanced for your cooperation.

H.-G. Rokita

You don't need PM-680EX-2.
You can directly modify with PM-680EX-6

nakayama

21M 02249

SSD-680STD用カラーユニット

CFM-680STD

据付 ~~仕様書~~・要領書

整理番号	MS5-0362	葉番	1/16

作成	担当	検印	承認
企画 課 93 年 3 月 11 日	企画G '93.3.11 近藤	企画G '93.3.11 馬木	[illegible] 入江

名称	SSD-680STD用カラーユニット
形名	CFM-680STD
オーダ	
納入先	
備考	

配布先

合計

1 対象機器 SSD-680STD

2 必要工具 3mmドライバー

3 改造時間 約3時間

4 改造手順

1)モニターの交換または追加

2) PCB交換、追加

EP-3461B-2→	EP-3461B-1
EP-2651E-3→	EP-2651E-3
追加	EP-5100B or C
	EP-3115D
	EP-3114E
	EP-2213B
	EP-2213B-1
	EP-3238
	EP-3443B-1

3) ショートプラグの削除

4) パネルスイッチの設定

5) 動作確認

1 Applied unit SSD-680STD

2 Tools Needed screw driver 3M

3 Modification Time 3hours

4 Modification Procedure

1) Change or add Monitor

2) Replace and instal PCB's

EP-3461B-2→	EP-3461B-1
EP-2651E-3→	EP-3461B-2
Instal	EP-5100B or C
	EP-3115D
	EP-3114E
	EP-2213B
	EP-2213B-1
	EP-3238
	3443B-1(NTSC)
	3443B-2(PAL)

3) Take off Short Plug

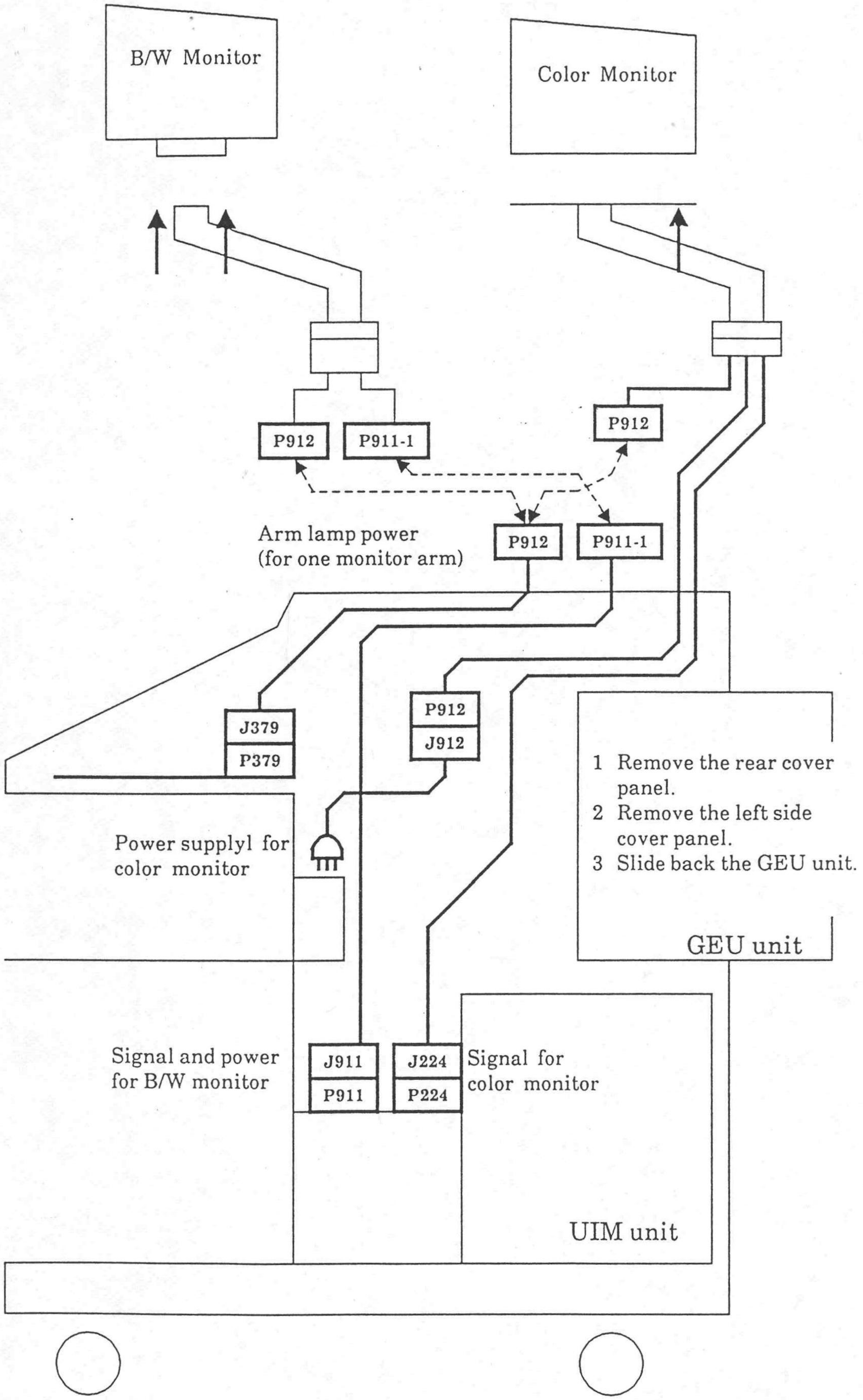
4) Set Dip Switch on Main Control

5) Check performance

出図印

改訂

1 モニターの交換または追加
Chan or add monitor


B/W Monitor
Color Monitor
P912
P911-1
P912
Arm lamp power
(for one monitor arm)
P912
P911-1
J379
P379
P912
J912
Power supplyl for
color monitor
GEU unit
Signal and power
for B/W monitor
J911
P911
J224
P224
Signal for
color monitor
UIM unit

1 Remove the rear cover panel.
2 Remove the left side cover panel.
3 Slide back the GEU unit.

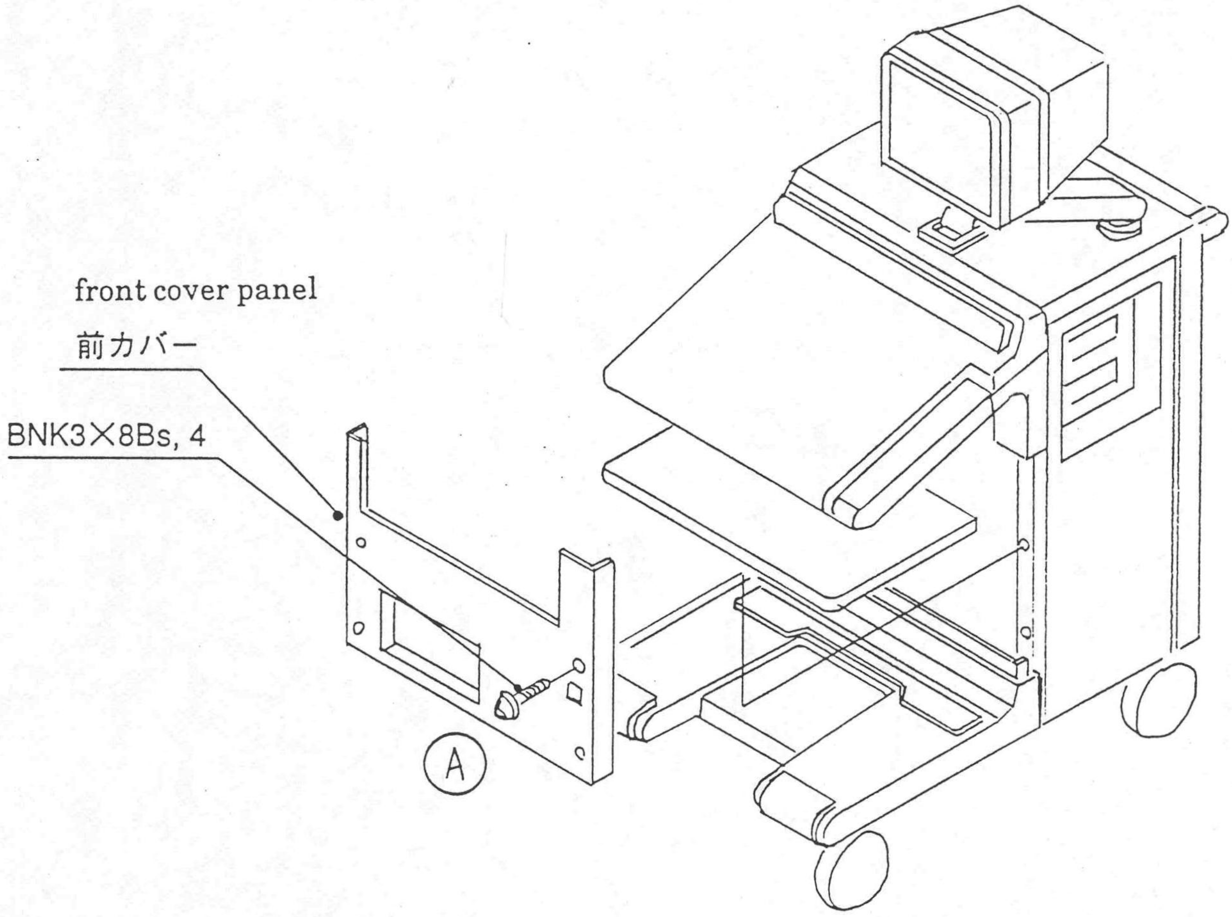
カバー類の取り外し方法　　Take off cover panels

S/N 21M08252～ の装置は(3) の作業は不要。

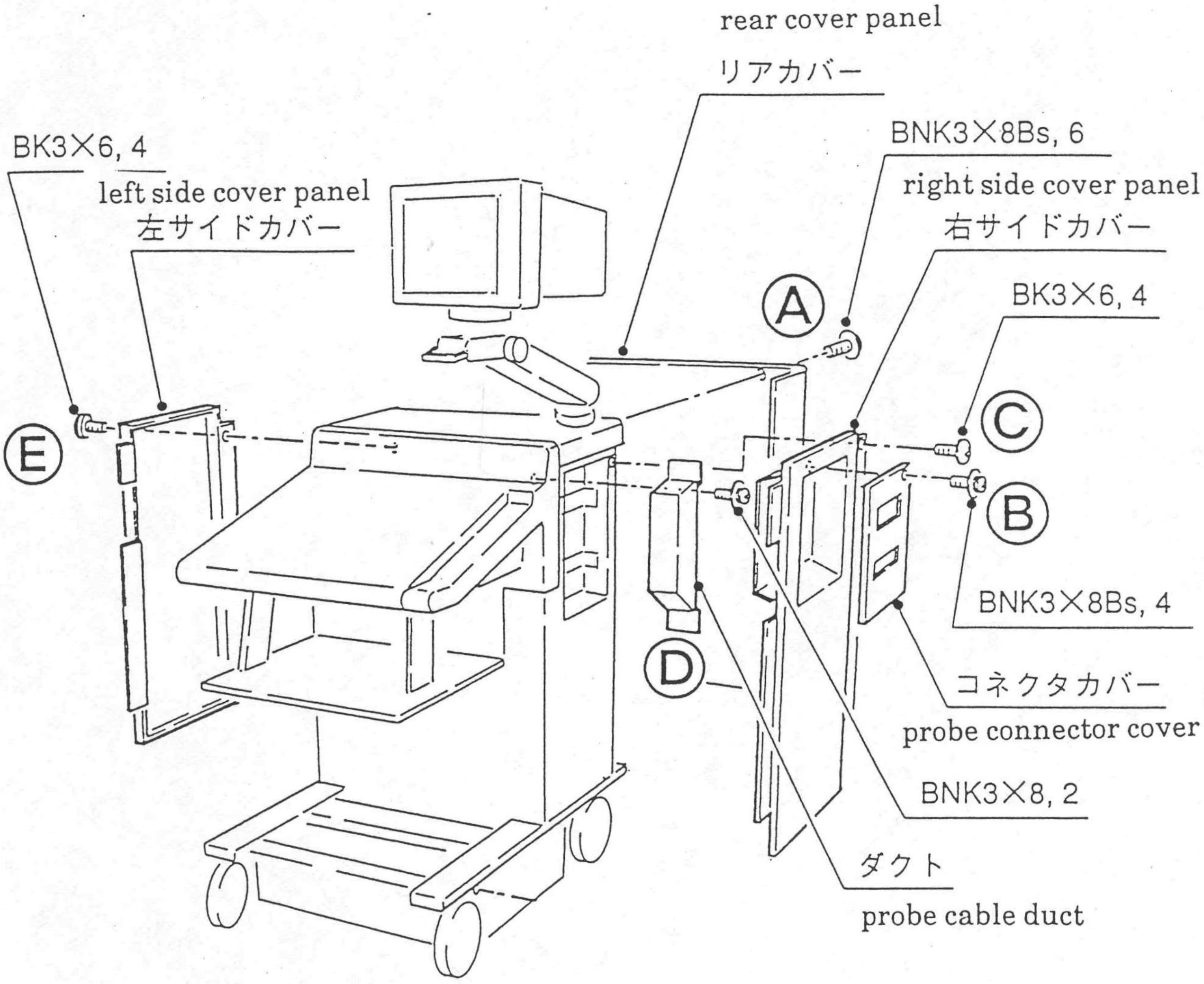
(1) 前カバーをねじ4本を外して取り外す。(図中 Ⓐ)

S/N 21M08252~do not need (3) procedure.

(1) Take off front cover panel.(fig.A)


front cover panel
前カバー
BNK3×8Bs, 4
A

(2) リアカバーをねじ6本を外して取り外す。(図中 Ⓐ)
(3) コネクタカバーをねじ4本外して取り外す。(図中 Ⓑ)
(4) 右サイドカバーをねじ4本を外し、後方にずらして取り外す。(図中 Ⓒ)
(5) ダクトをねじ2本を外して取り外す。(図中 Ⓓ)
(6) 左サイドカバーをねじ4本を外し、(7)と同様に取り外す。(図中 Ⓔ)


rear cover panel
リアカバー
BK3×6, 4
left side cover panel
左サイドカバー
BNK3×8Bs, 6
right side cover panel
右サイドカバー
BK3×6, 4
A
C
B
E
BNK3×8Bs, 4
D
コネクタカバー
probe connector cover
BNK3×8, 2
ダクト
probe cable duct

(2) Take off rear cover panel.(fig.A)

(3) Take off probe connector cover.(fig.B)

(4) Slide back right side cover panel and take off.(fig.C)

(5) Take off probe cale duct.(fig.D)

(6) Slide back left side cover panel and take off.(fig.E)

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Way to take off units

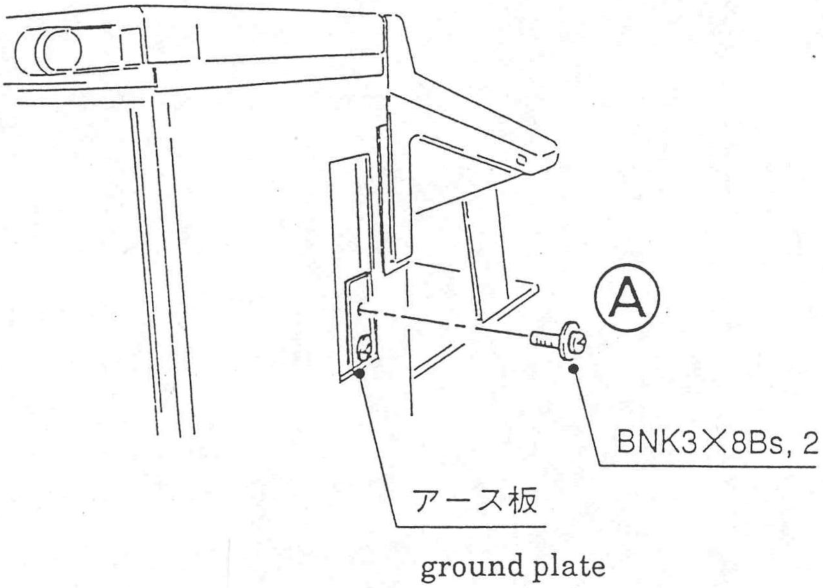
- ユニットの取り外し方法

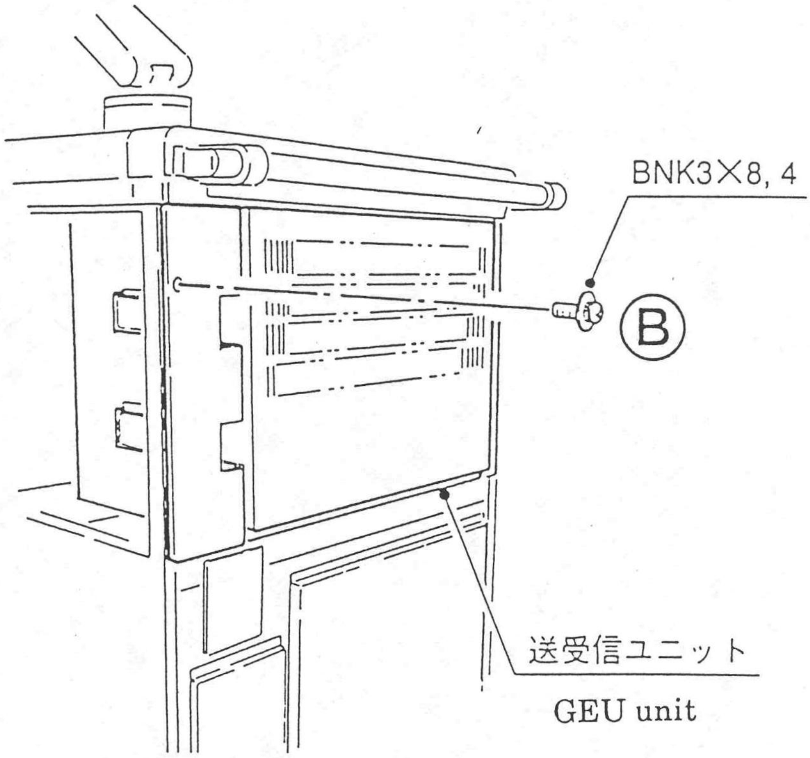
(1) 左側面のアース板のねじ2本を外す。(図中 Ⓐ)

(2) 送受信ユニットをねじ4本を外して取り外す。(図中 Ⓑ)

(1) Take off two screws of left side ground plate.(fig.A)

(2) Take off four screws of the GEU unit and slide it back.(fig.B)


Ⓐ
BNK3×8Bs, 2
アース板
ground plate


BNK3×8, 4
Ⓑ
送受信ユニット
GEU unit

モニタアーム (L-Ki-263B) の取り外し方法　Way to take off the arm

(1) DSCユニット接栓板に接続されている信号ケーブルの中継コネクタ (J911-1, P911-1) を取り外す。(図中 Ⓐ)

(2) 信号ケーブルをクランプ1個から取り外す。(図中 Ⓑ)

(3) ランプケーブルをパネルエスカッションのクランプ2個から取り外す。(図中 Ⓒ)

(4) ランプケーブルのコネクタ (J379) をパネルインターフェースPC板から取り外す。(図中 Ⓓ)

(5) モニタアームを上方へ引き上げ、本体から取り外す。(図中 Ⓔ)

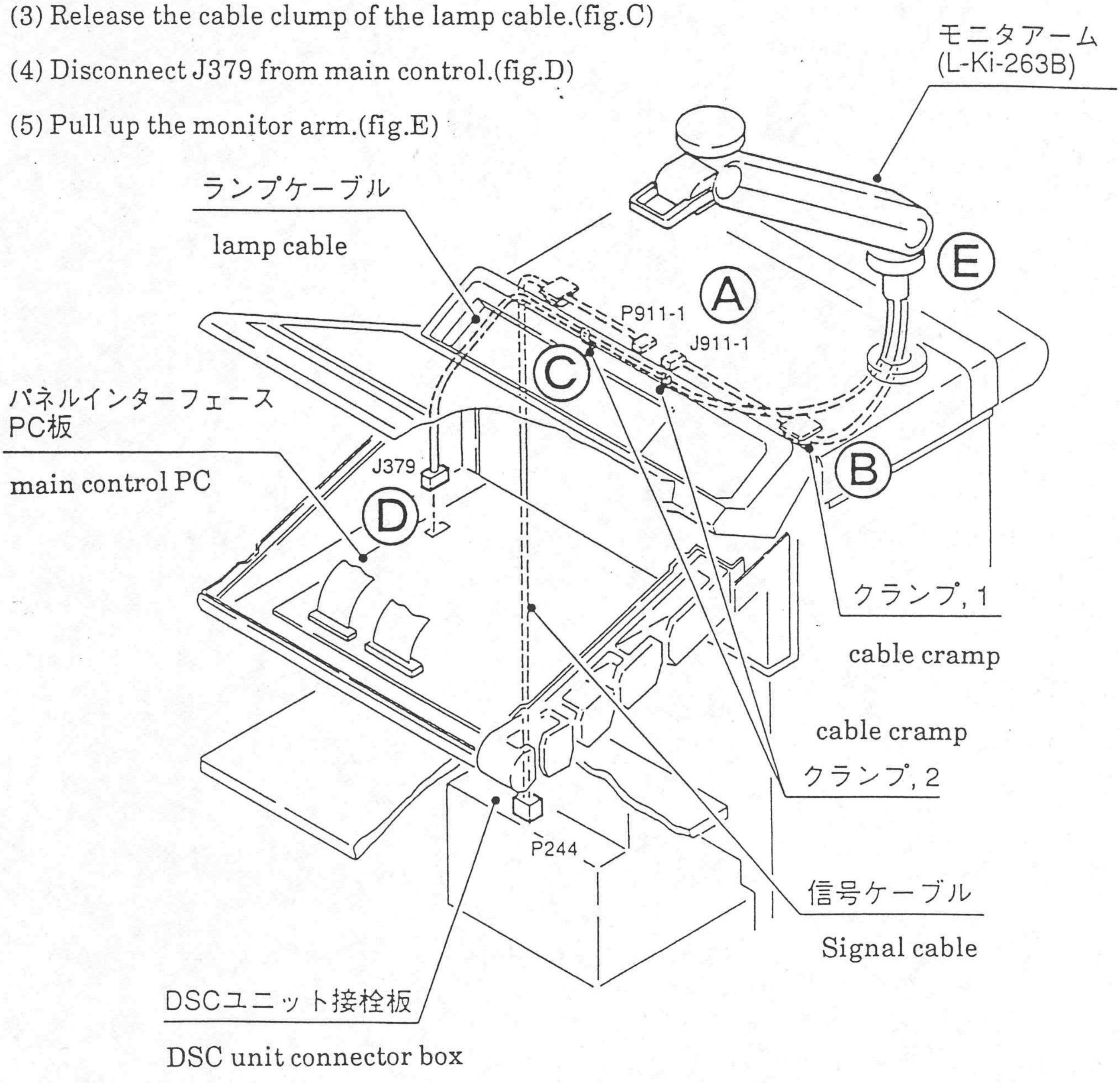
(1) Disconnect J911-1 from P911-1.(fig.A)

(2) Release the cable clump of the signal cable.(fig.B)

(3) Release the cable clump of the lamp cable.(fig.C)

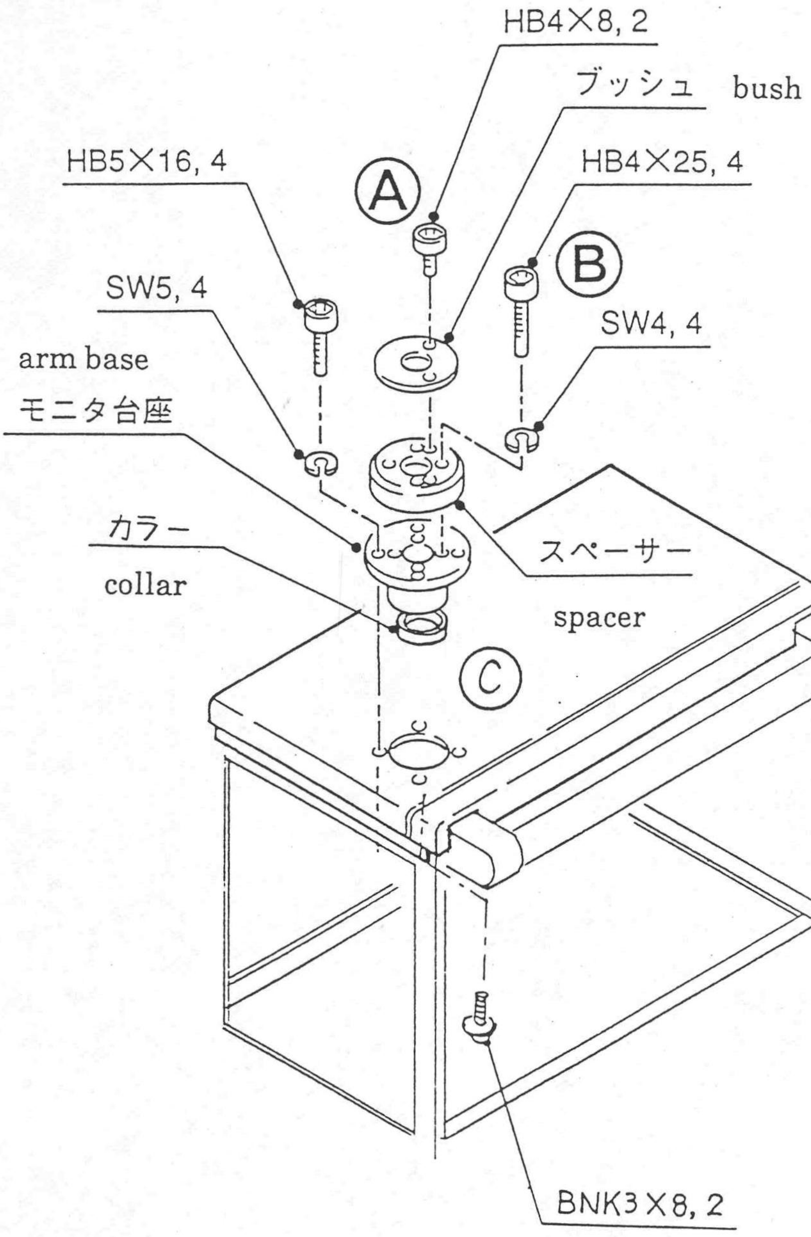
(4) Disconnect J379 from main control.(fig.D)

(5) Pull up the monitor arm.(fig.E)


モニタアーム
(L-Ki-263B)
ランプケーブル
lamp cable
Ⓐ
P911-1
J911-1
Ⓔ
Ⓒ
パネルインターフェース
PC板
main control PC
J379
Ⓓ
Ⓑ
クランプ, 1
cable cramp
cable cramp
クランプ, 2
P244
信号ケーブル
Signal cable
DSCユニット接栓板
DSC unit connector box

モニタ台座の取り外し方法

(1) ブッシュを六角穴付ボルト2本を外して取り外す。(図中 Ⓐ)
(2) スペーサーを六角穴付ボルト4本とスプリングワッシャー4個を外して取り外す。(図中 Ⓑ)
(3) モニタ台座とカラーを六角穴付ボルト4本とスプリングワッシャー4個と下方のねじ2本を外して取り外す。(図中Ⓒ)


HB4×8, 2
ブッシュ bush
HB5×16, 4
Ⓐ
HB4×25, 4
Ⓑ
SW5, 4
SW4, 4
arm base
モニタ台座
カラー
collar
スペーサー
spacer
Ⓒ
BNK3×8, 2

Way to take off arm base

(1) Take off the bush.(fig.A)

(2) take off the spacer.(fig.B)

(3) Take off the arm base and collar.(fig.C)

カラーモニター用台座の右側への取付方法

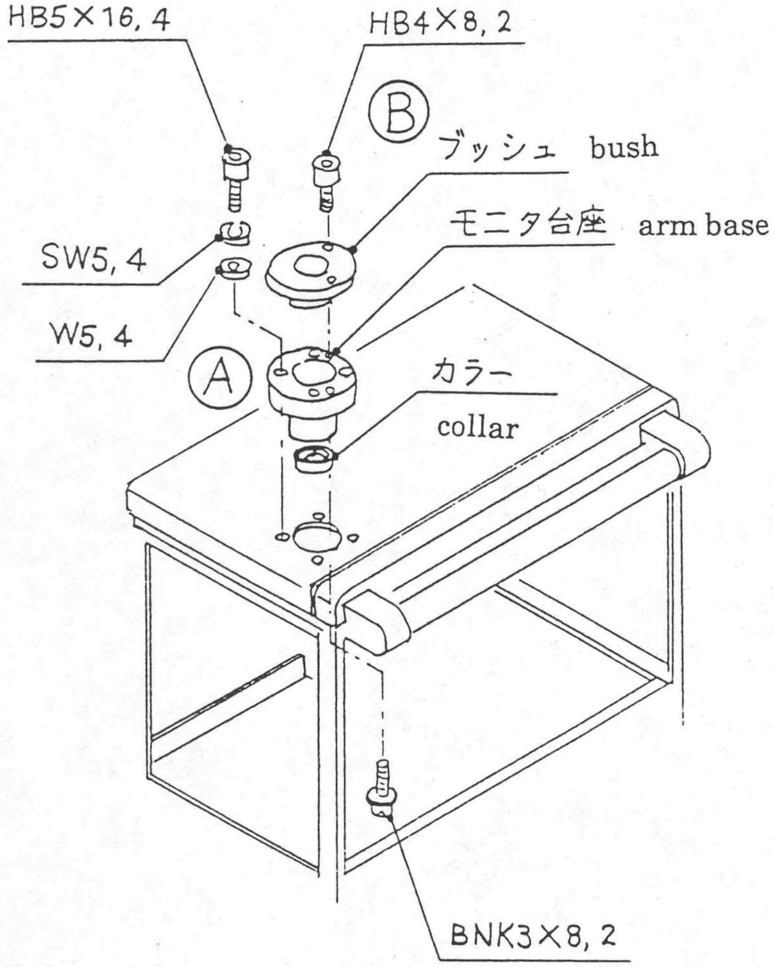
(1) 台座とカラーを六角穴付ボルト, スプリングワッシャー, ワッシャー各4コと下方の2本のねじで固定する。(図中Ⓐ)

(2) ブッシュを六角穴付ボルト2本で固定する。(図中Ⓑ)

Way to install the arm base at the right side

(1) Fix the arm base and collar.(fig.A)

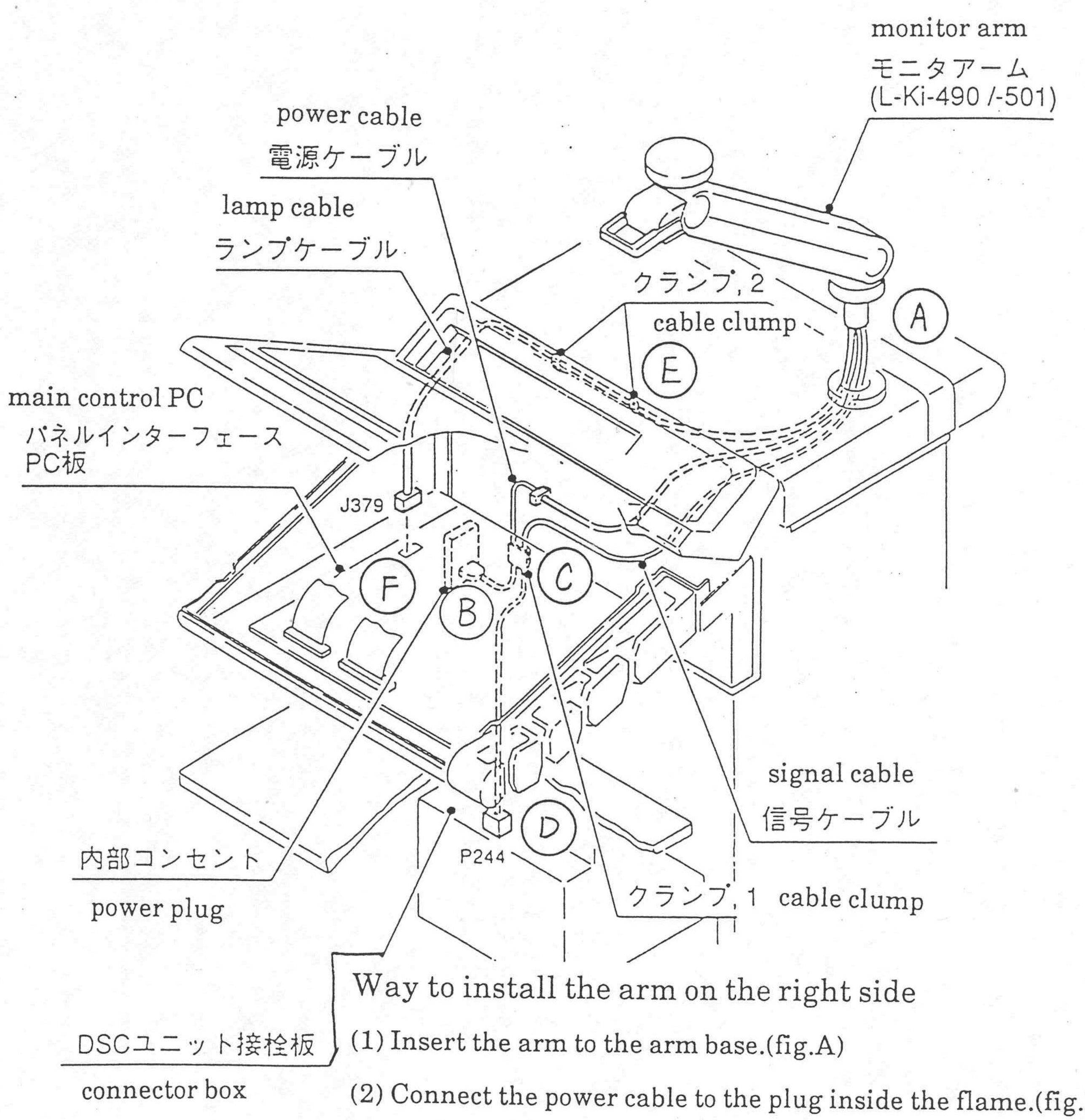
(2) Fix the bush.(fig.B)


HB5×16, 4
HB4×8, 2
Ⓑ
ブッシュ bush
モニタ台座 arm base
SW5, 4
W5, 4
Ⓐ
カラー
collar
BNK3×8, 2

モニタアーム (L-Ki-490 /-501) の取り付け方法

(1) モニタアームを台座に差し込む。(図中Ⓐ)
(2) 内部コンセントに電源ケーブルを接続する。(図中Ⓑ)

(3) 信号ケーブルと電源ケーブルをクランプする。(図中Ⓒ)
(4) 信号ケーブルのコネクタ (P244) をDSCユニット接栓板 に 取り付ける。(図中Ⓓ)
(5) ランプケーブルをパネルエスカッションのクランプ2個 に 取り付ける。(図中Ⓔ)
(6) ランプケーブルのコネクタ (J379) をパネルインターフェースPC板 に 取り付ける。(図中Ⓕ)


monitor arm
モニタアーム
(L-Ki-490 /-501)
power cable
電源ケーブル
lamp cable
ランプケーブル
クランプ, 2
cable clump
A
E
main control PC
パネルインターフェース
PC板
J379
F
B
C
D
P244
signal cable
信号ケーブル
内部コンセント
power plug
クランプ, 1 cable clump
DSCユニット接栓板
connector box

Way to install the arm on the right side

(1) Insert the arm to the arm base.(fig.A)

(2) Connect the power cable to the plug inside the flame.(fig.B)

(3) Clump the signal cable and the power cable.(fig.C)

(4) Connect J244 to P244 on the connector box of DSC unit.(fig.D)

(5) Clump the lamp cable.(fig.E)

(6) Connect J379 to P379 on main control PC.(fig.F)

カラーモニター用台座左側への取付方法

(1) アーム用フタをトップカバーから取り外す(図中Ⓐ)

(2) 台座とカラーを六角穴付ボルト, スプリングワッシャー, ワッシャー各4コと下方の2本のねじで固定する。(図中Ⓑ)

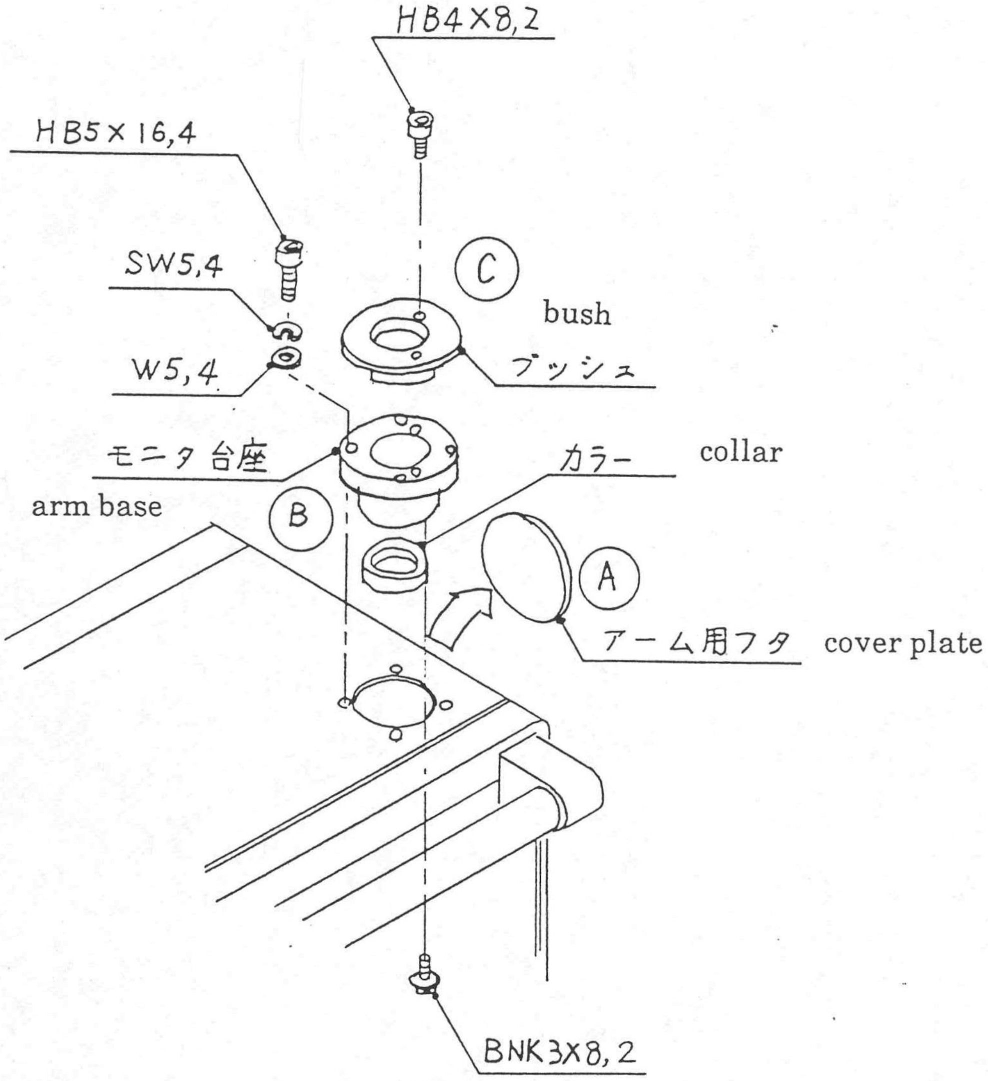
(3) ブッシュを六角穴付ボルト2本で固定する。(図中Ⓒ)

Way to install the arm base at the left side

(1) Take off the cover plate.(fig.A)

(2) Fix the arm base and collar.(fig.B)

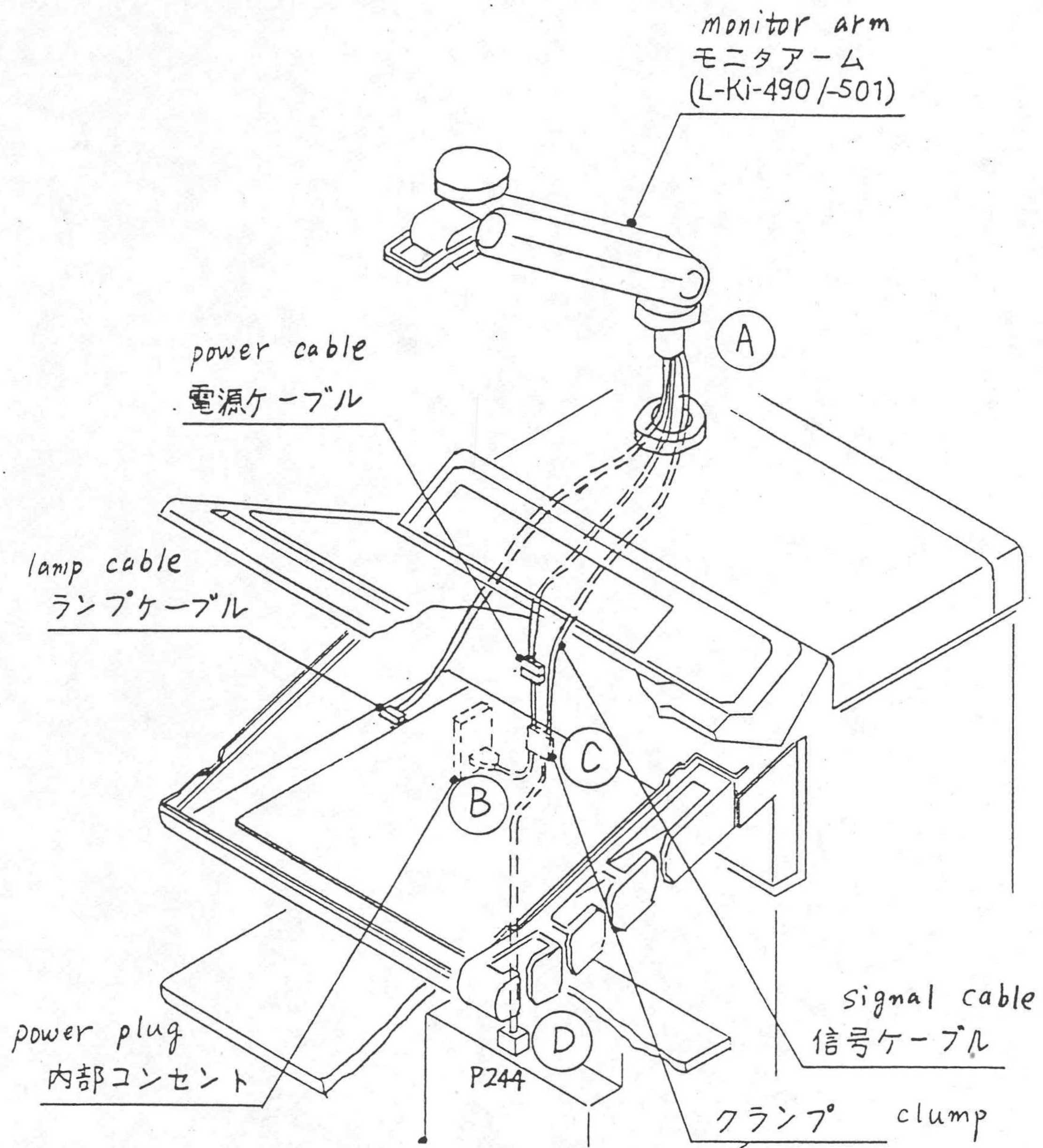
(3) Fix the bush.(fig.C)


HB4×8,2
HB5×16,4
SW5,4
W5,4
Ⓒ
bush
ブッシュ
モニタ台座
arm base
Ⓑ
カラー
collar
Ⓐ
アーム用フタ
cover plate
BNK3×8,2

モニタアーム (L-Ki-490 /-501) の 左側取り付け方法

(1) モニタアームを台座に差し込む。(図中Ⓐ)
(2) 内部コンセントに電源ケーブルを接続する。(図中Ⓑ)

(3) 信号ケーブルと電源ケーブルをクランプする。(図中Ⓒ)
(4) 信号ケーブルのコネクタ (P244) をDSCユニット接栓板 に取り付ける。(図中Ⓓ)
(5) ランプケーブルはコネクティングしない。


monitor arm
モニタアーム
(L-Ki-490 /-501)
A
power cable
電源ケーブル
lamp cable
ランプケーブル
C
B
signal cable
信号ケーブル
power plug
内部コンセント
D
P244
クランプ clump

Way to install the arm on the left side

(1) Insert the arm to the arm base.(fig.A)

(2) Connect the power cable to the plug inside the flame.(fig.B)

(3) Clump the signal cable and the power cable.(fig.C)

(4) Connect J244 to P244 on the connector box of DSC unit.(fig.D)

(5) Do not connect lamp cable

12/1

○ モニタ (IPC-1010, 1010V)

(2) チルト台のつめをモニタ底面のフック金具にひっかけてから、
モニタを、チルト台にねじ2本で取付ける。(図中 Ⓐ)

(3) ACケーブルを、モニタ背面に接続する。(図中 Ⓑ)

(4) 信号ケーブルをモニタに接続し、取付けねじ2本で固定する。(図中 Ⓒ)

(5) ACケーブル固定金具を、ねじ2本で取付ける。(図中 Ⓓ)

○ Monitor (IPC-1010, 1010V)

(2) Hook the claw of the tilt table onto the hook metal fitting on the under side of the monitor and then , mount the monitor on the tilt table with 2 screws. (Ⓐ in Fig.)

(3) Connect the AC cable to the back of the monitor. (Ⓑ in Fig.)

(4) Connect the sibnal cable to the monitor and fasten 2 fixing screws. (Ⓒ in Fig.)

(5) Install the AC cable fixing metal fitting with 2 screws. (Ⓓ in Fig.)

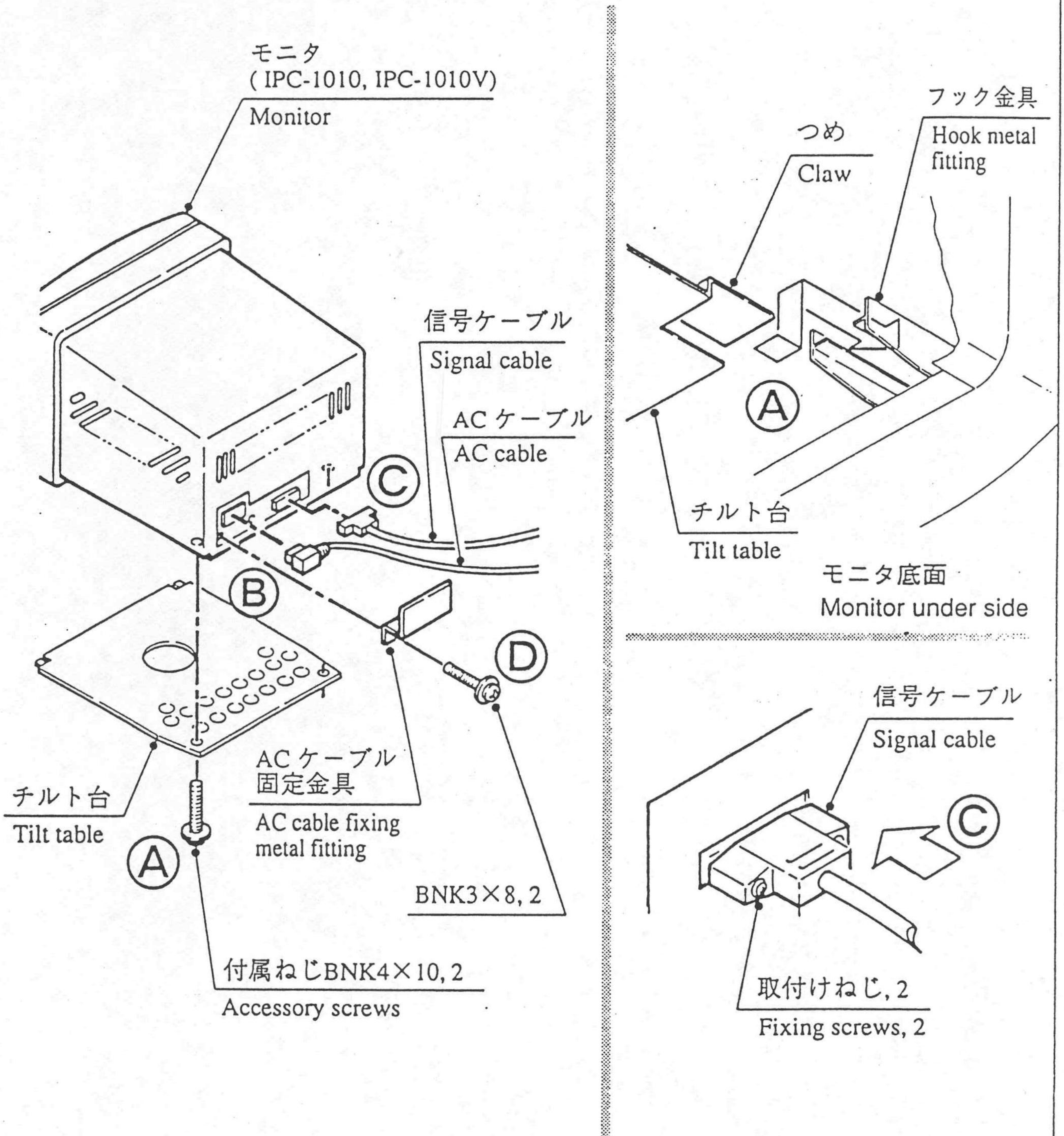
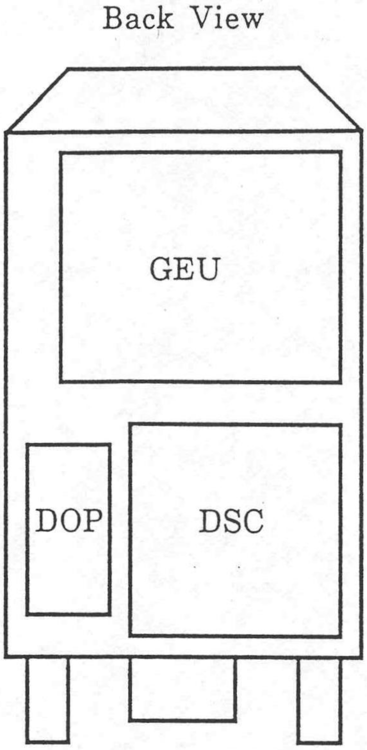
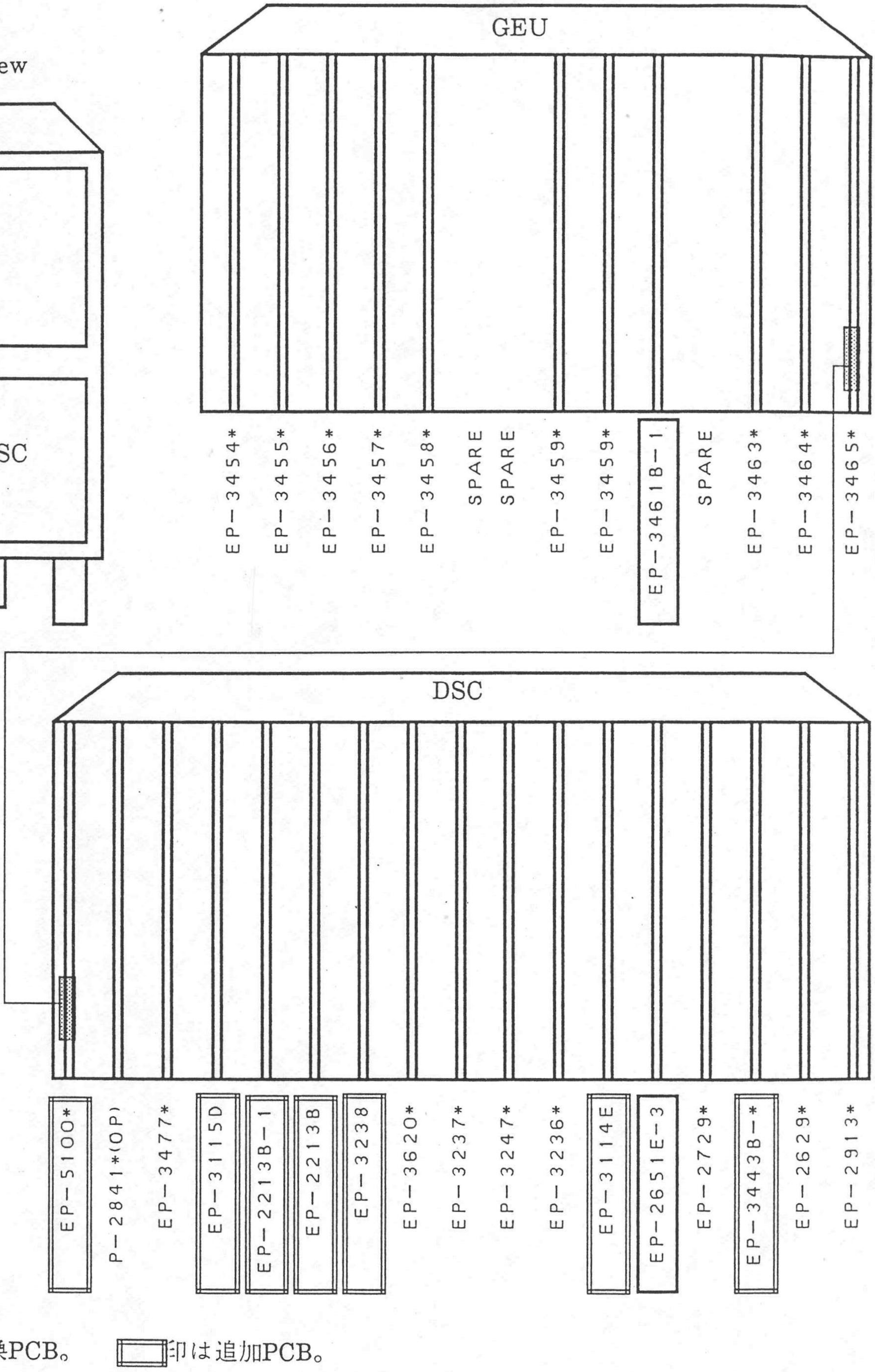

モニタ
(IPC-1010, IPC-1010V)
Monitor
信号ケーブル
Signal cable
AC ケーブル
AC cable
Ⓒ
Ⓑ
Ⓓ
チルト台
Tilt table
Ⓐ
AC ケーブル
固定金具
AC cable fixing
metal fitting
BNK3×8, 2
付属ねじBNK4×10, 2
Accessory screws
フック金具
Hook metal
fitting
つめ
Claw
Ⓐ
チルト台
Tilt table
モニタ底面
Monitor under side
信号ケーブル
Signal cable
Ⓒ
取付けねじ, 2
Fixing screws, 2

図2 Fig. 2

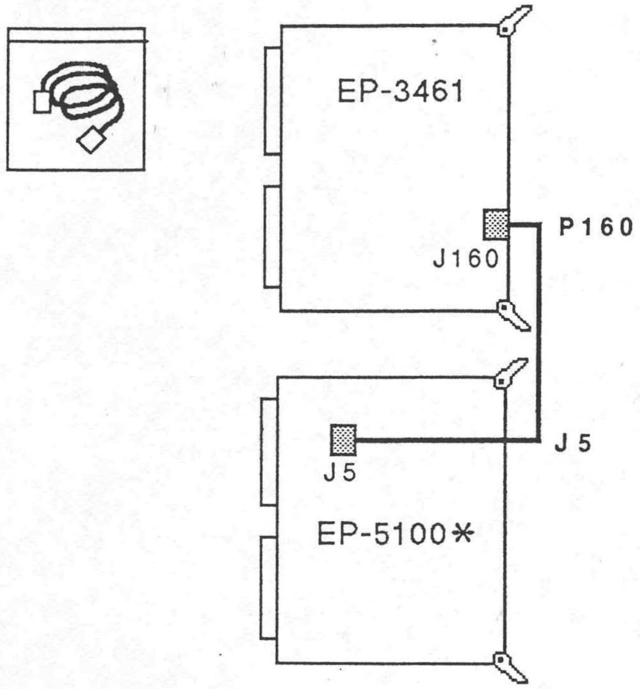
2　PCBの交換、追加

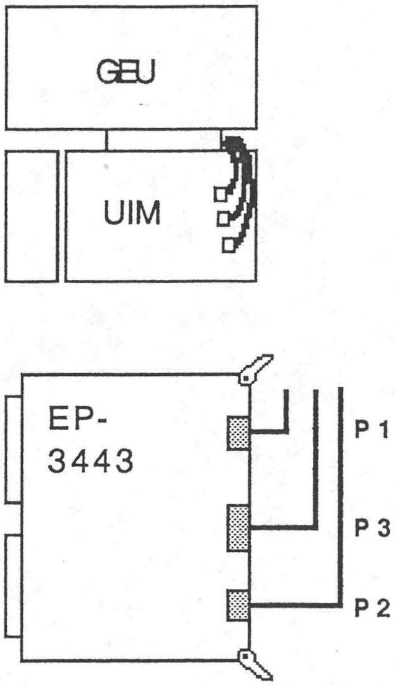
2　Replace and instal PCB's

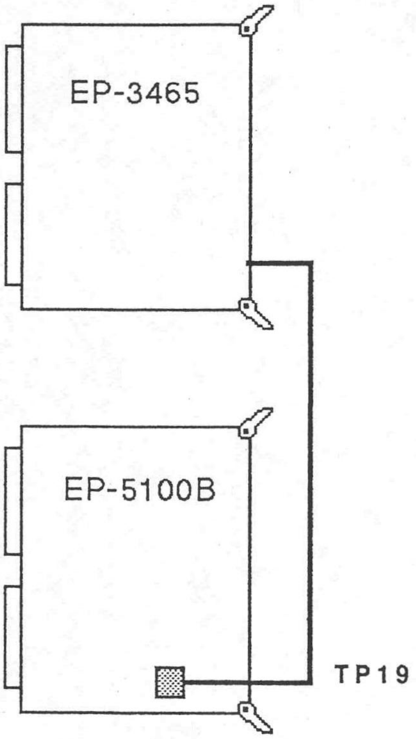

Back View
GEU
DOP
DSC

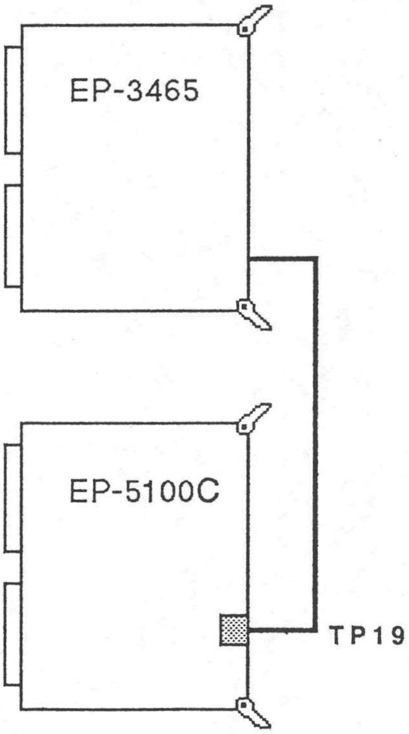

GEU
EP－3454*
EP－3455*
EP－3456*
EP－3457*
EP－3458*
SPARE
SPARE
EP－3459*
EP－3459*
EP－3461B－1
SPARE
EP－3463*
EP－3464*
EP－3465*
DSC
EP－5100*
P－2841*(OP)
EP－3477*
EP－3115D
EP－2213B－1
EP－2213B
EP－3238
EP－3620*
EP－3237*
EP－3247*
EP－3236*
EP－3114E
EP－2651E－3
EP－2729*
EP－3443B－*
EP－2629*
EP－2913*

□ 印は交換PCB。　▨ 印は追加PCB。
□ for replacement　▨ for additional installation


EP-3461
P160
J160
EP-5100*
J5
J5


GEU
UIM
EP-
3443
P1
P3
P2


EP-3465
EP-5100B
TP19

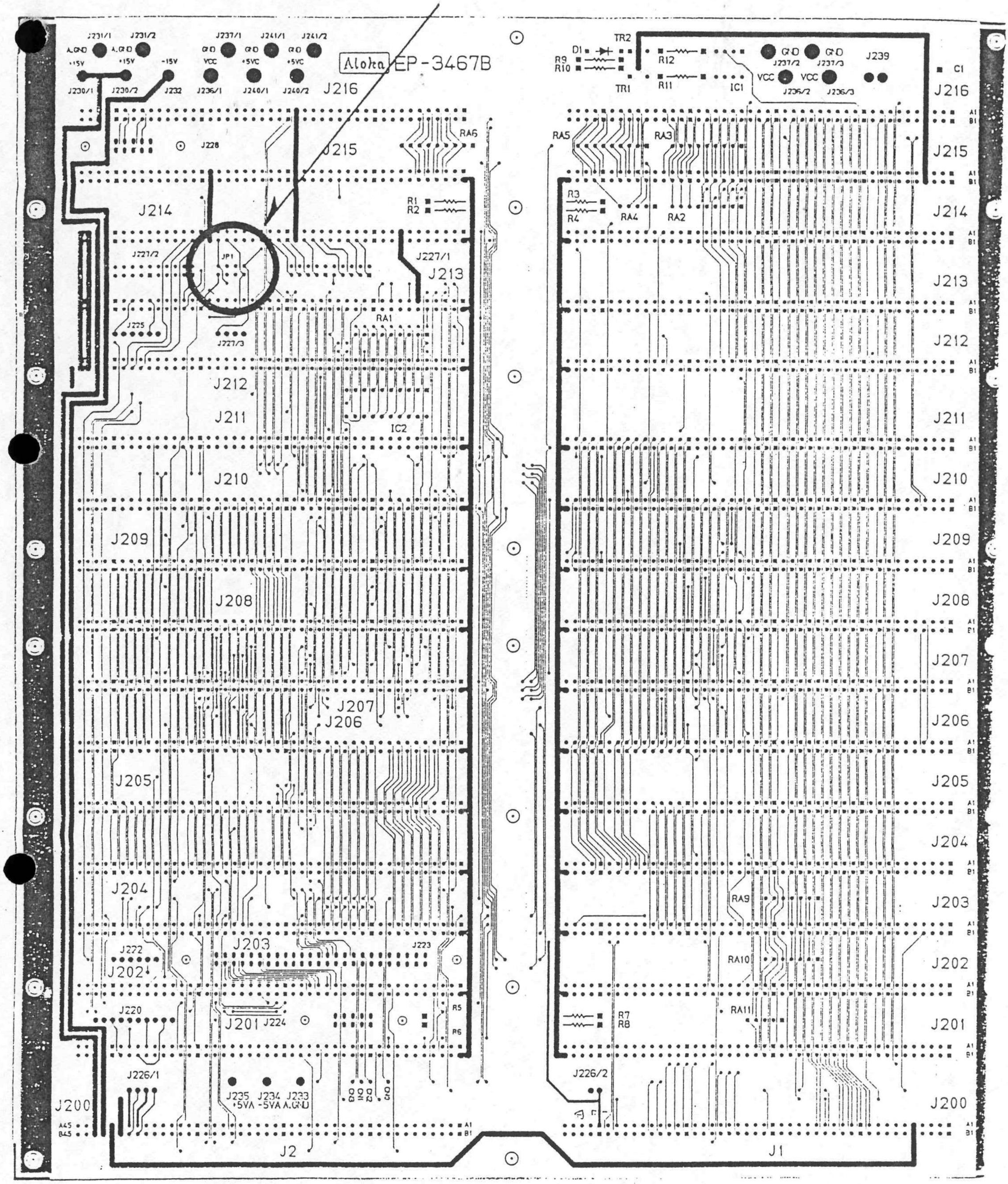

EP-3465
EP-5100C
TP19

3 ショートプラグの取り外し

Take off short plugs.

4つのショートプラグをすべて外す

Take off all 4 short plugs.


Aloka EP-3467B
J231/1
J231/2
J237/1
J241/1
J241/2
A.GND
+15V
-15V
GND
VCC
+5VC
J230/1
J230/2
J232
J236/1
J240/1
J240/2
D1
R9
R10
TR2
TR1
R12
R11
IC1
J237/2
J237/3
J236/2
J236/3
J239
C1
J216
J215
J214
J213
J212
J211
J210
J209
J208
J207
J206
J205
J204
J203
J202
J201
J200
J228
J227/1
J227/2
J227/3
JP1
J225
RA1
RA2
RA3
RA4
RA5
RA6
RA9
RA10
RA11
R1
R2
R3
R4
R5
R6
R7
R8
IC2
J222
J223
J220
J224
J226/1
J226/2
J235
J234
J233
+5VA
-5VA
A.GND
A1
B1
A45
B45
J2
J1

DSC Mother Board.

DSCユニットの右側のPCBを数枚抜き、マザーボード上のショートプラグ(上図)を4つすべて外す。

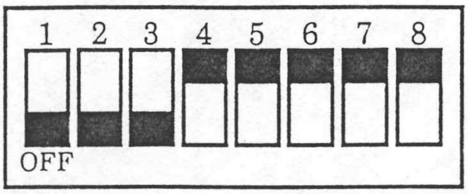
Take out several PCB's of the DSC unit, and take off all 4 short plugs on the mother board.(see above schematics)

4　パネルスイッチの設定

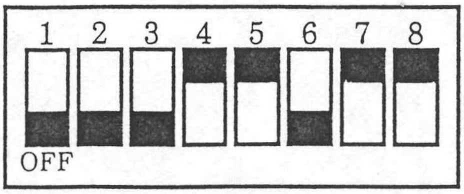
4　Set the digital switch on main control

国内、一般貿易向け
For all countries exept USA

UGR-680STDが接続されている場合
In case UGR-680STD is installed

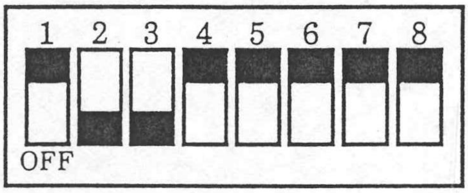

1
2
3
4
5
6
7
8
OFF

UGR-680STDが接続されていない場合
In case UGR-680STD is not installed

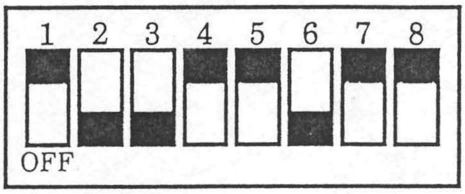

1
2
3
4
5
6
7
8
OFF

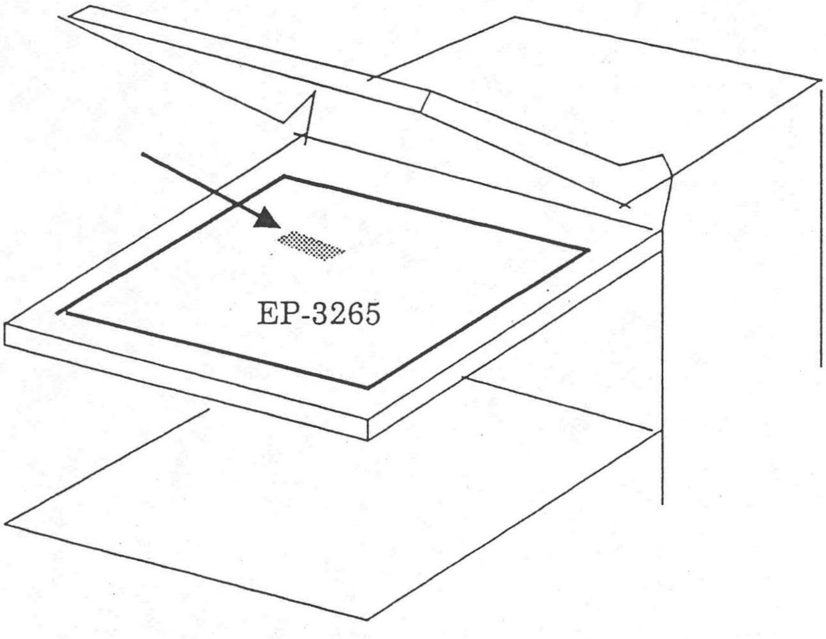
Aloka USAおよびCorometrics向け
For Aloka USA and Corometrics

UGR-680STDがが接続されている場合
In case UGR-680STD is installed


1
2
3
4
5
6
7
8
OFF

UGR-680STDが接続されていない場合
In case UGR-680STD is not installed


1
2
3
4
5
6
7
8
OFF



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5　動作確認

電源を投入し、*PRESET＋6*を押してRAMの内容を一旦全てクリアーする。

SSD-680EX/STDの取扱い説明書を参考にカラー機能に関して動作確認を行う。

全てのカラー機能の動作が正常であることを確認した後、全てのパネルを取りつける。

5 Check Performance

After the modification is done, power on and press *PRESET + 6* to clear RAM.

According to the operation manual of SSD-680EX/STD, check all the performance of color function.

If you find no problem, put on all the cover panels.

13-1 Appliance of Parts List

This Parts List consists of the parts for technical service and maintenance. Therefore, the parts model name (PARTS No.) is only valid to the technical support. When you order the parts shown in the List, please apply to our technical support section.

Before you find the parts with this Parts List, please note that nobody can use any description in this List for the other purpose.

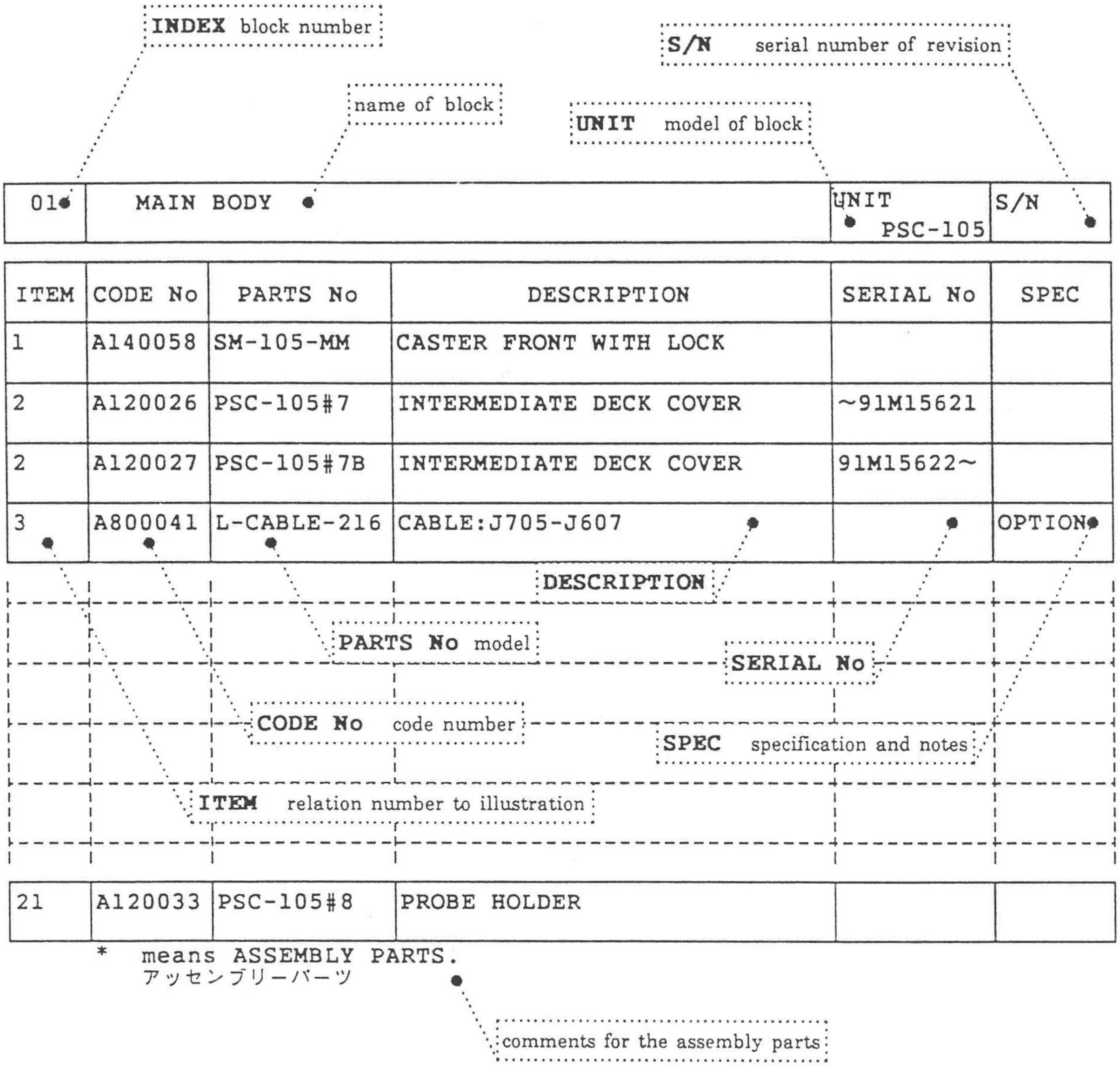
13-2 Outline of Parts List

This Parts List shows many parts which are selected for the technical support and maintenance, and made with the Illustrations and Lists. These parts are selected with one of the basis as below,

- For the surface of the equipment such as Cover and Connector
- Machinery and things to be broken without difficulty
- Operation panel including the Knob and Switch
- Cables
  excluding one soldered to the other part directly.
- PCB
  please refer to the History which has been issued separately, because almost of the PCBs has the revisions.
- The things to be replaced frequently such as the variable resistor for the panel
- General small parts such as screws and cable clamps
  The location are not shown in the illustration.
- Things to be needed additionally for the technical support

13-3 Explanation of Parts List

This Parts List is divided by some blocks (INDEX), and each block consists of the Illustration and List.



01	MAIN BODY	UNIT PSC-105	S/N

ITEM	CODE No	PARTS No	DESCRIPTION	SERIAL No	SPEC
1	A140058	SM-105-MM	CASTER FRONT WITH LOCK		
2	A120026	PSC-105#7	INTERMEDIATE DECK COVER	~91M15621	
2	A120027	PSC-105#7B	INTERMEDIATE DECK COVER	91M15622~	
3	A800041	L-CABLE-216	CABLE:J705-J607		OPTION
21	A120033	PSC-105#8	PROBE HOLDER		

* means ASSEMBLY PARTS.
アッセンブリーパーツ

INDEX block number
S/N serial number of revision
name of block
UNIT model of block
DESCRIPTION
PARTS No model
SERIAL No
CODE No code number
SPEC specification and notes
ITEM relation number to illustration
comments for the assembly parts

INDEX	The number of the division for each Parts List (Illustrations and Lists). This is indicated in the illustration for whole equipment at the beginning.
UNIT	The name of this block (or unit) indicated by **INDEX**. If the same block or unit will be revised, it will be distinguished with this and next **S/N**.

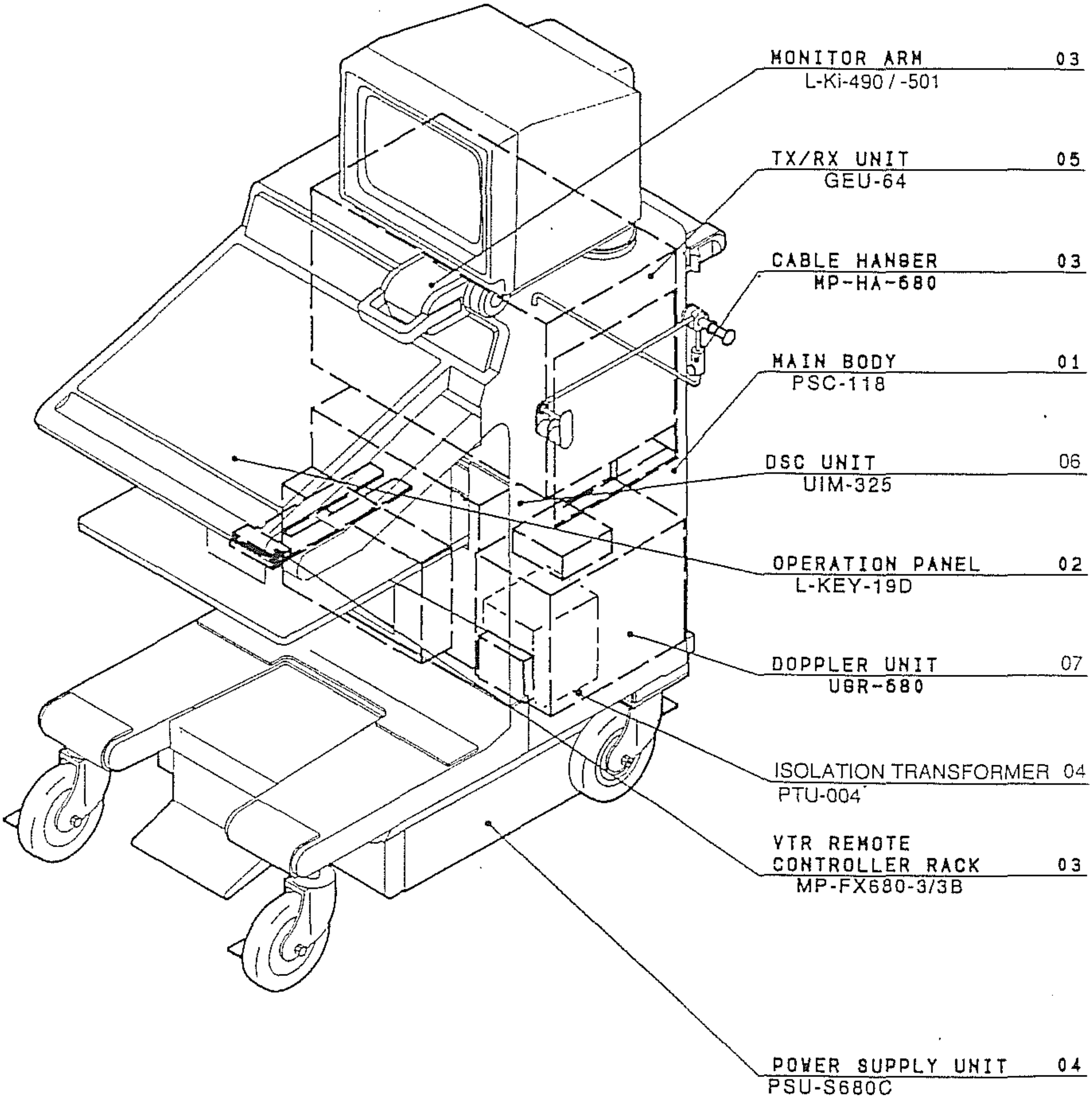
S/N	If the same block or unit will be revised, it will be distinguished with **UNIT**, and this shows the beginning of production change.
ITEM	Relation numbers between Illustration and List.
CODE No	Code number applied one by one to each parts. However, at this time (Apr.-'93), it is not acceptable to order.
PARTS No	Parts number.
SERIAL No	Applied serial number. If it shows "×××××~", the part is available to the serial number or after. On the other side, "~×××××" means valid to the serial number and before. If the blank, it is not depended on the serial number.
SPEC	The specification, some differences on shipment, and the other remarks are shown.

13-4 Attention

- Prohibition to use both previous and current format of Parts List.
  In the current one, the model names of some parts are deferent from previous.

- Reference with "History" for the order of PCBs.
  This Parts List does not show the PCB version (or not follow the each revision). Therefore, when you order the PCBs, please see the "History" issued separately.

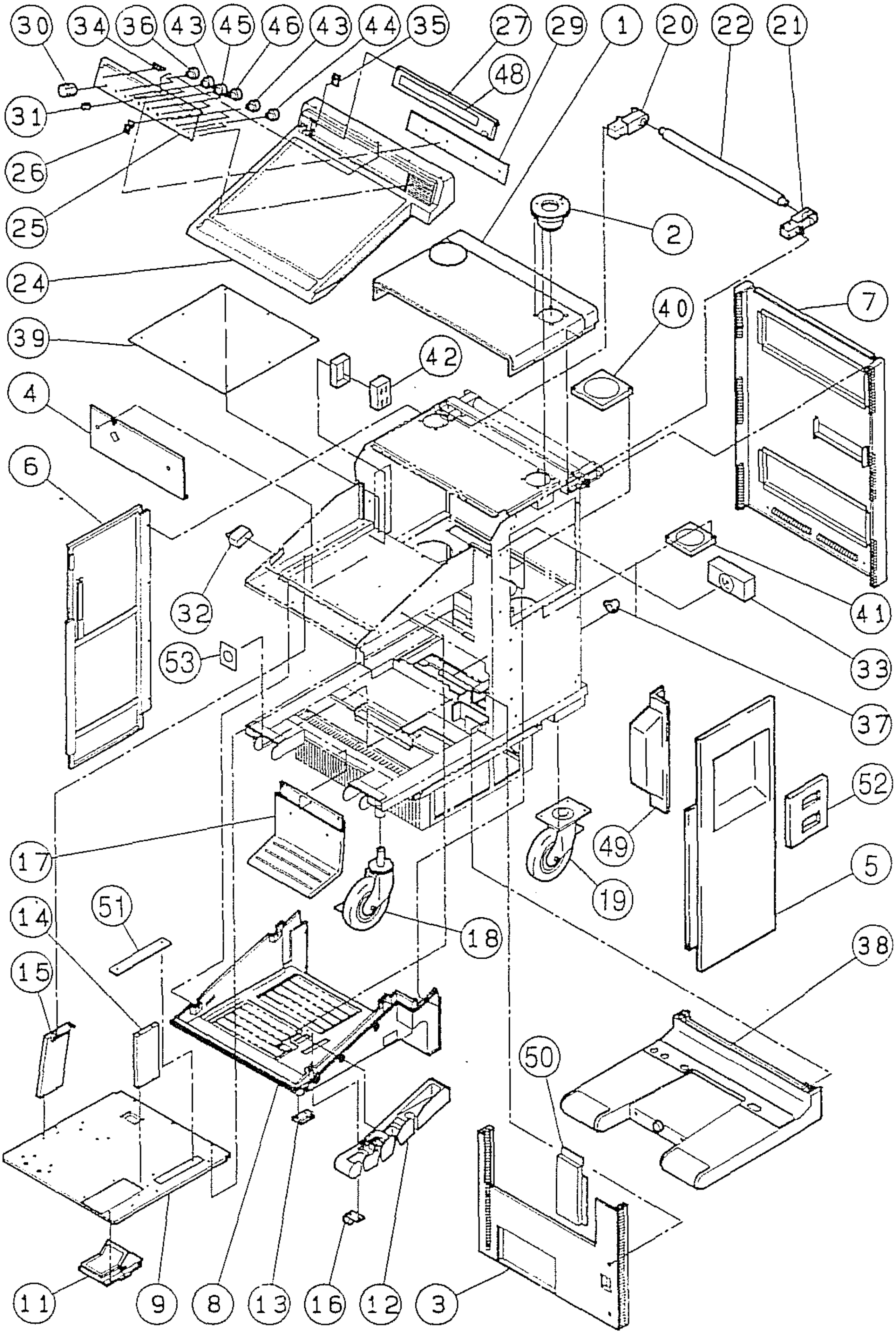
13-5 Parts List


MONITOR ARM 03
L-Ki-490 / -501
TX/RX UNIT 05
GEU-64
CABLE HANGER 03
MP-HA-680
MAIN BODY 01
PSC-118
DSC UNIT 06
UIM-325
OPERATION PANEL 02
L-KEY-19D
DOPPLER UNIT 07
UGR-680
ISOLATION TRANSFORMER 04
PTU-004
VTR REMOTE
CONTROLLER RACK 03
MP-FX680-3/3B
POWER SUPPLY UNIT 04
PSU-S680C

CABLES SEE
INDEX 08

SCREWS & SMALL PARTS
SEE INDEX 09

01	MAIN BODY:	UNIT PSC-118	S/N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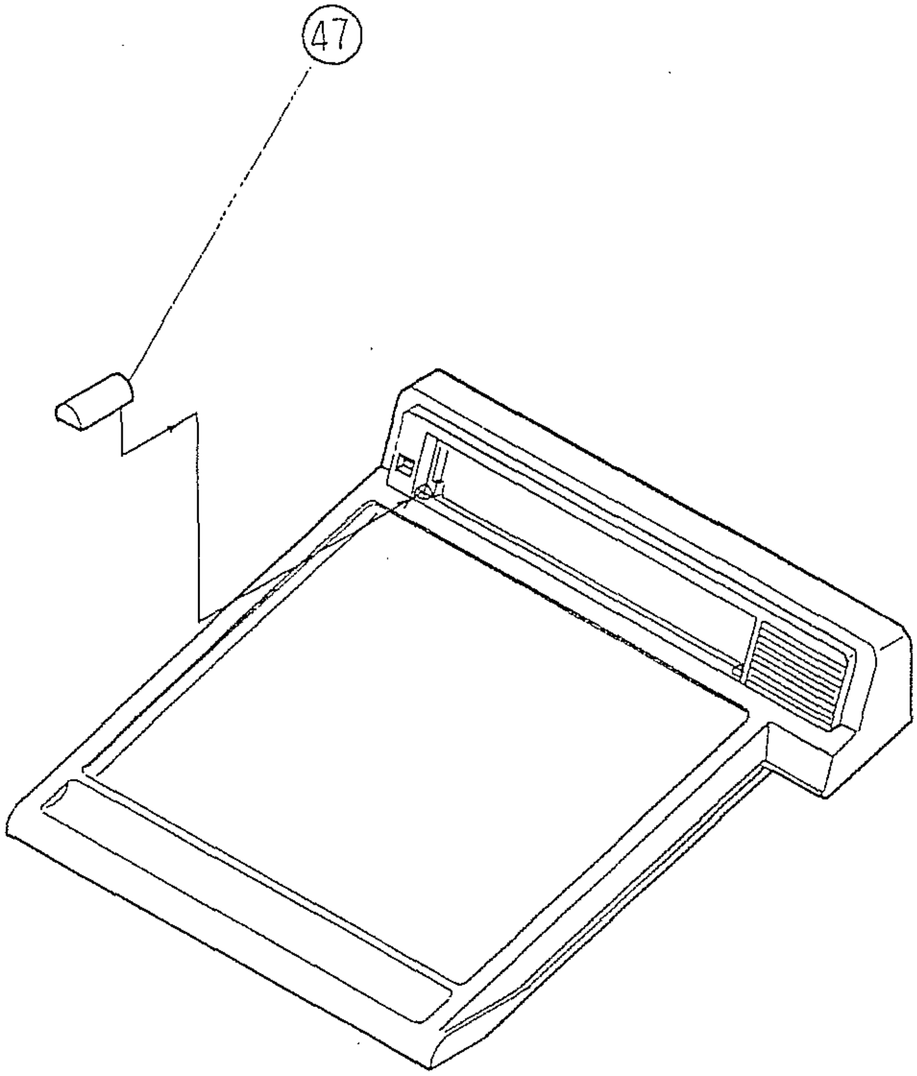
		UNIT	S / N
01	MAIN BODY	PSC-118	



01	MAIN BODY	UNIT PSC-118	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
1	※A200379	SAP-680-01-01	COVER:TOP		EXCEPT USA
1	※A200529	SAP-680-01-01 -A.A.	COVER:TOP		FOR USA(A.A)
1	※A200530	SAP-680-01-01 -CORO	COVER:TOP		FOR USA(CORO.)
2	※A200380	SAP-680-01-02	BASE:MONITOR ARM		
3	※A200531	SAP-680EX-01-03	COVER:FRONT		EXCEPT USA
3	※A200532	SAP-680EX-01-03 -A.A	COVER:FRONT		FOR USA(A.A)
3	※A200533	SAP-680EX-01-03 -CORO	COVER:FRONT		FOR USA(CORO.)
4	※A200384	SAP-680-01-04	COVER:INTERMEDIATE		
5	※A200534	SAP-680EX-01-05	COVER:RIGHT		
6	※A200535	SAP-680EX-01-06	COVER:LEFT		
7	※A200536	SAP-680EX-01-07	COVER:REAR		EXCEPT USA
7	※A200537	SAP-680EX-01-07 -A.A	COVER:REAR		FOR USA(A.A)
7	※A200538	SAP-680EX-01-07 -CORO	COVER:REAR		FOR USA(CORO.)
8	※A200539	SAP-680EX-01-08	COVER:PANEL, BOTTOM		
9	※A200540	SAP-680EX-01-09	DECK:INTERMEDIATE		
11	※A200392	SAP-680-01-11	JELL BOTTLE HOLDER		
12	A120003	PSC-108#18	PROBE HOOK		
13	A110008	PSC-108#33	RAIL:REMOTE CONTROL RACK		
14	A110009	PSC-108#52	INTERMEDIATE DECK ARM(1)		
15	※A200393	SAP-680-01-15	INTRTMEDIATE DECK ARM(2)		
16	A140018	B-1075	HINGE		
17	A120107	MP-FX680EX-1#1	FOOT REST		
18	A140011	SSC-150-CB	CASTER :FRONT		

※ means ASSEMBLY PARTS.
アッセンブリーパーツ

01	MAIN BODY	UNIT PSC-118	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
19	A150001	L-Ki-232	CASTER :REAR		
20	※A200541	SAP-680EX-01-20	HANDLE ARM :RIGHT		
21	※A200542	SAP-680EX-01-21	HANDLE ARM :LEFT		
22	A110002	PSC-108#28	HANDLE		
24	※A200554	SAP-680EX-01-24	COVER: PANEL	~	
25	※A200543	SAP-680EX-01-25	BLIND PANEL		
26	※A200399	SAP-680-01-26	SPRING:BLIND DOOR		
27	※A200544	SAP-680EX-01-27	BLIND DOOR		EXCEPT CORO.
29	A800738	EP-2512※	PCB:BLIND PANEL		
30	A510000	SP-4107u-1	KNOB		
31	A510013	SP-4108	KNOB		
32	A611063	L-S-59	SWITCH:POWER		
33	A624004	SS-433	SPEAKER		
34	A800739	EP-2510※	PCB:PHONE JACK		
35	A800740	EP-3143※	PCB		
36	A623033	RV16YN20SC5kΩ	VOLUME:AUDIO VOLUME		
37	A601000	D8-701B-00	INDEPENDENT CONNECTOR:J302		
38	※A200545	SAP-680EX-01-38	COVER:BASE		
39	A800742	EP-3265※	PCB:MAIN CONTROL		
40	A625003	109S-086	FAN		
41	A625004	109S-096	FAN		
42	A601001	WK-3004	AC RECEPTACLE:J320, 321		
43	A623034	RV12YP20SB5kΩ	VOLUME:AGC(B, M), ECOH ERASE		

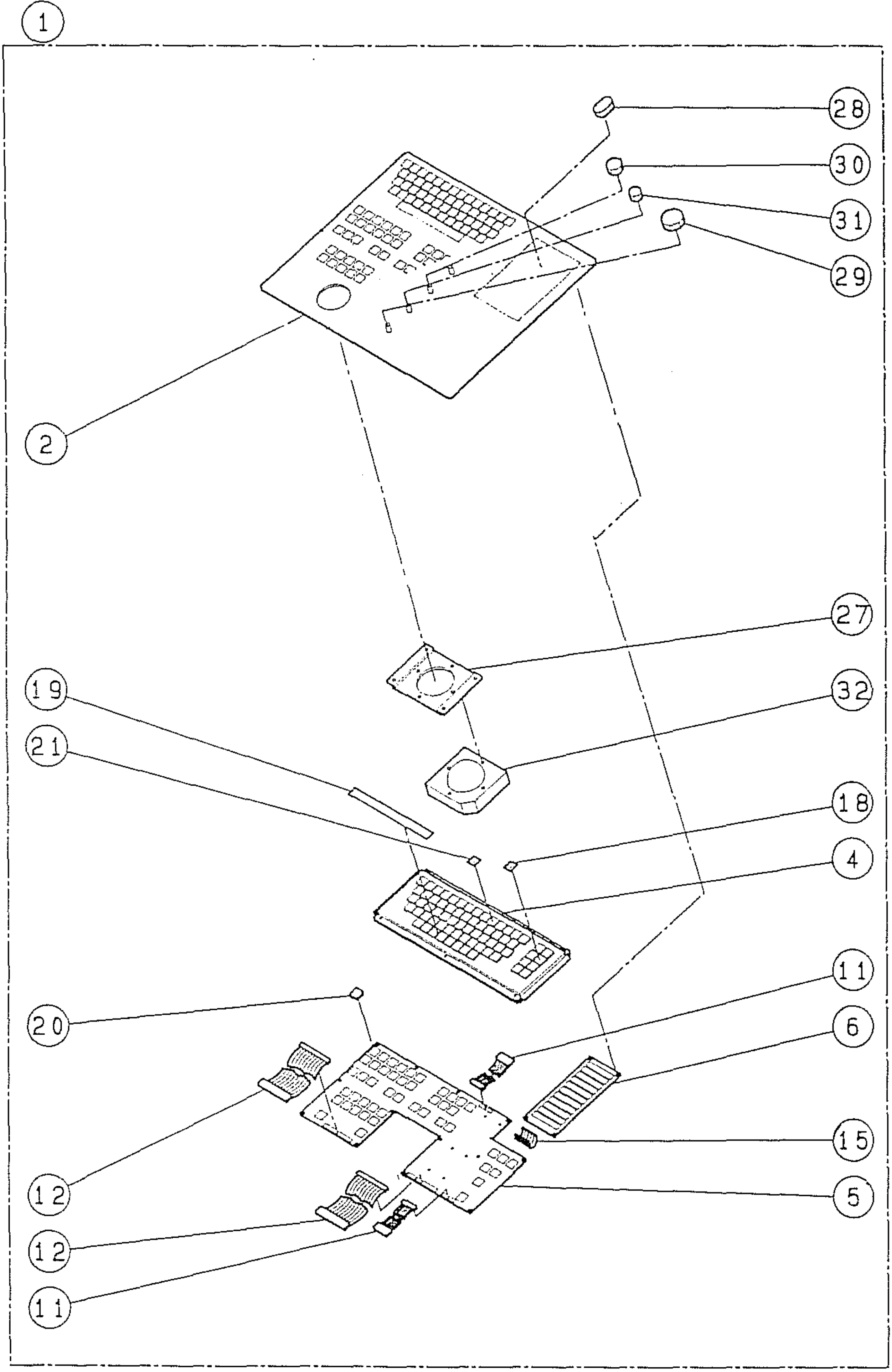
※ means ASSEMBLY PARTS. .
アッセンブリーパーツ .

01	MAIN BODY	UNIT PSC-118	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
44	A611053	D-2012B	SWITCH:FTC, POS/NEG, INT/EXT		
45	A611064	L-S-52	SWITCH:SWEEP SPEED		
46	A611065	L-S-53	SWITCH:CONTRAST(B, M)		
47	A120100	PSC-108#60	STOPPER		
48	A600096	P-32-680-CORO	NAME PLATE		For USA (CORO.
49	A110142	PSC-118#67	DUCT		
50	A110143	PSC-118#69	JB COVER		
51	A110144	SAP-680EX-01-51	COVER:INTERMEDIATE DECK		
52	A110145	PSC-118#32	COVER:COSMETIC, CONNECTOR	～21M08512	
53	A600032	PSC-108#56	LABEL:INDEPENDENT		

※ means ASSEMBLY PARTS. .
アッセンブリーパーツ .

0 2	OPERATION PANEL	UNIT L-KEY-19D	S/N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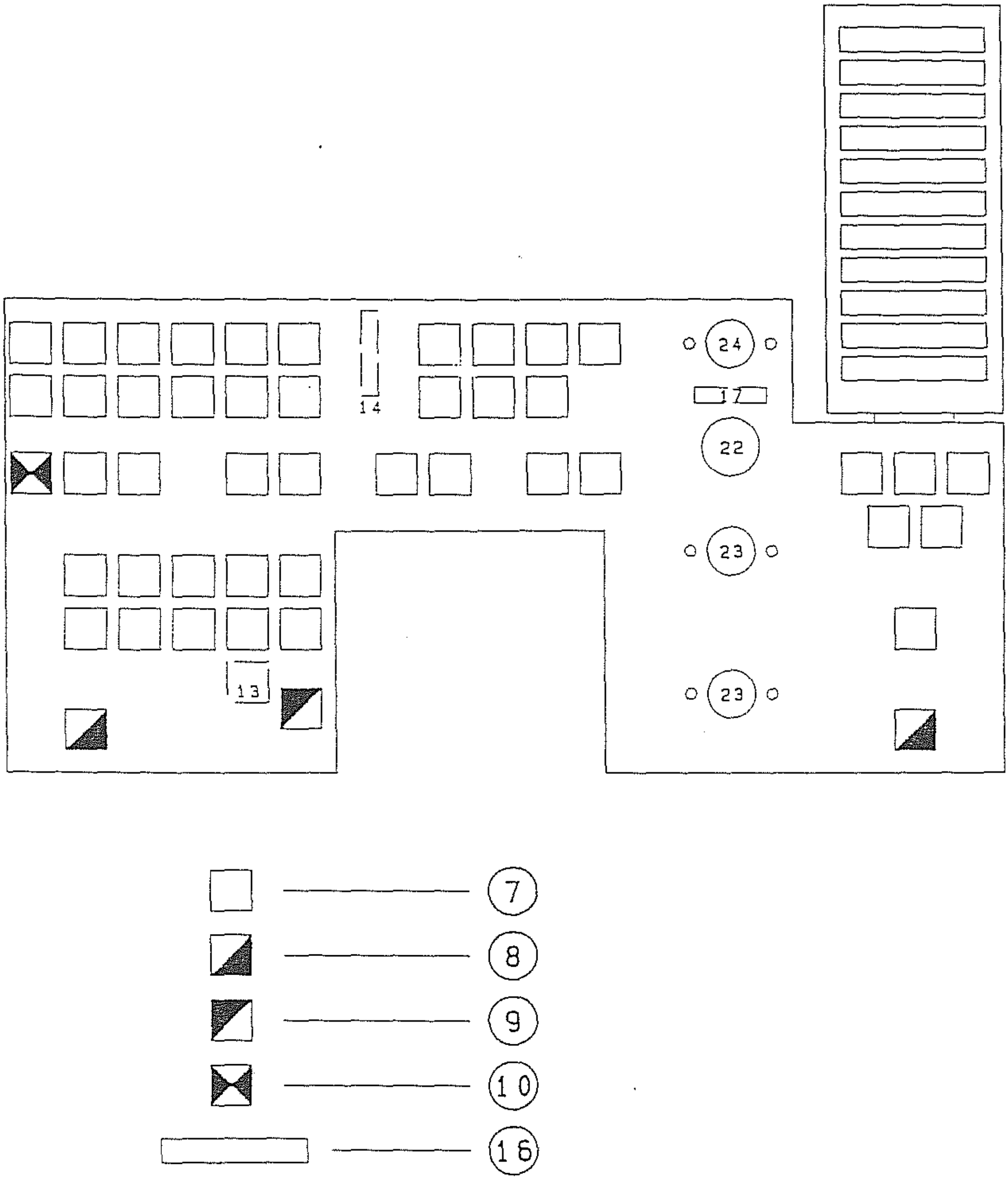
02	OPERATION PANEL	UNIT L-KEY-19D	S/N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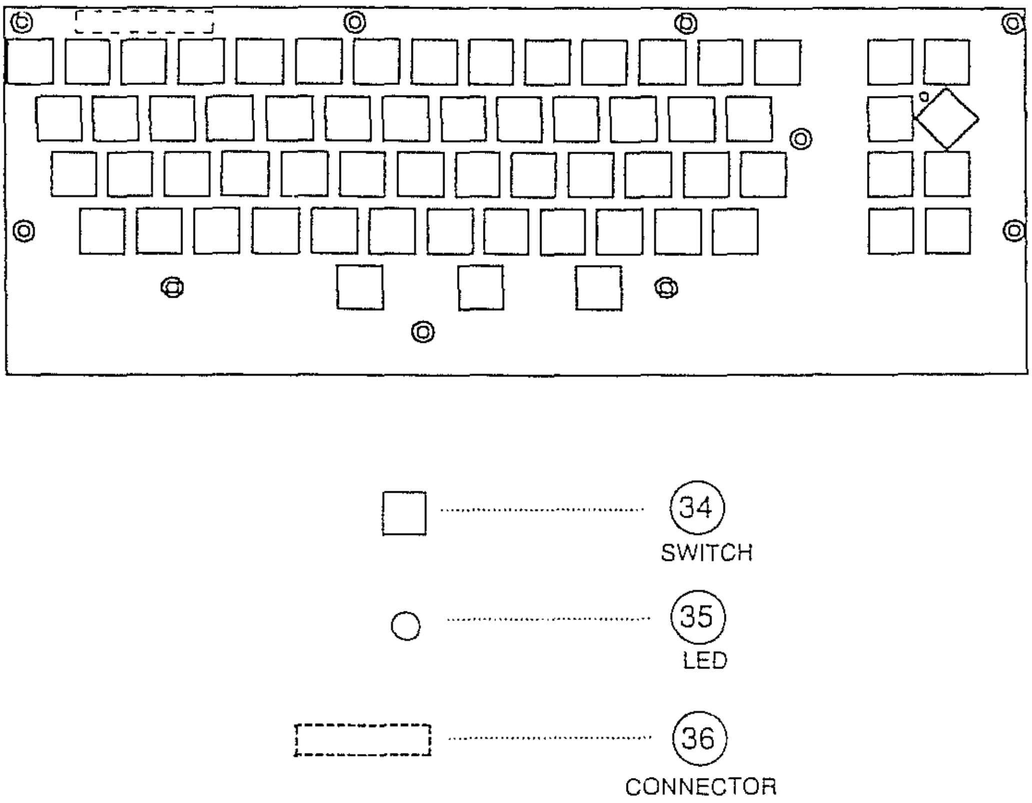
02	OPERATION PANEL	UNIT L-KEY-26	S / N


34
SWITCH
35
LED
36
CONNECTOR

02	OPERATION PANEL	UNIT L-KEY-19D/26	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
1	※A200555	L-KEY-19D	PANEL FULL ASSEMBLY		
2	※A200556	SAP-680EX-02-02	PANEL SHEET		
4	※A200162	L-KEY-26	FULL KEY BOARD ASSY		
5	A800987	EP-2960	PCB:SW		
6	A800744	EP-3182	PCB:RV		
7	A611002	A3FA-101-O	SWITCH(ORANGE)		
8	A611003	A3FA-401-Y	SWITCH(YELLOW)		
9	A611004	A3FA-401-O	SWITCH(ORANGE)		
10	A611005	A3FA-101-G	SWITCH(GREEN)		
11	※A200409	L-KEY-19#19	CABLE ASSY:J363, J362		
12	※A200410	L-KEY-19#18	CABLE ASSY:J360, J361		
13	A601003	5046-06A	CONNECTOR:J365		
14	A601002	5046-04A	CONNECTOR:J391		
15	※A200411	L-KEY-19C#20	JUMPER CABLE		
16	A623000	EVA-UBH-S15-B13	RV:STC		
17	A601006	3429-6002LCSC	CONNECTOR:J364		
18	※A200412	L-KEY-19C#26	KEY BUTTON:RED		
19	※A200413	L-KEY-19C#24	KEY BUTTON:SPACE		
20	※A200414	L-KEY-19C#16	KEY BUTTON:WHITE		
21	※A200415	L-KEY-19C#15	KEY BUTTON:CLEAR		
22	A611001	SRM-1-01-11	ROTARY SWITCH		
23	A623001	RV20YP1-23S-B1K	VARIABLE RESISTOR ROTARY		
24	A623002	RV20YP1-23S-B5K	VARIABLE RESISTOR ROTARY		

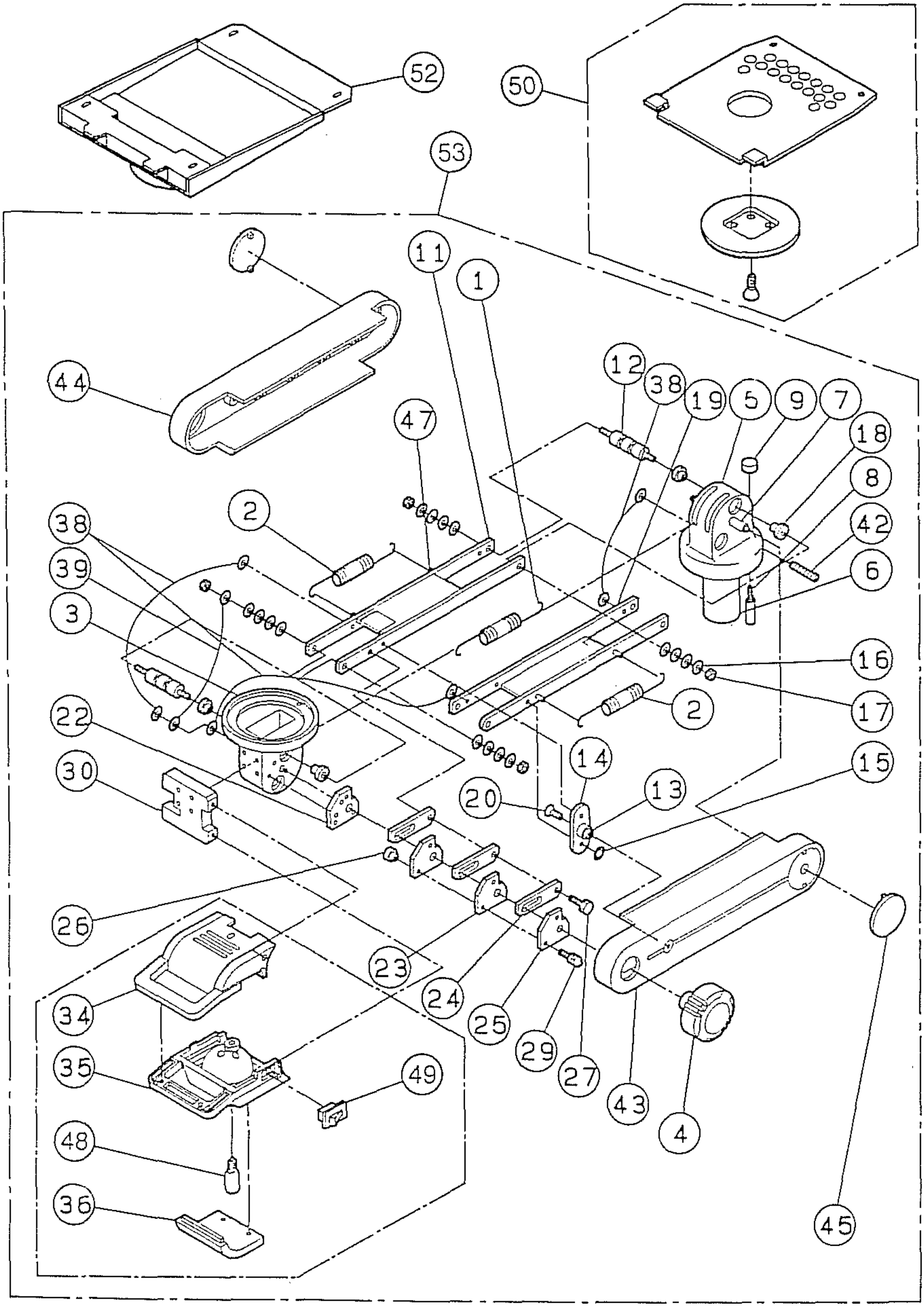
※ means ASSEMBLY PARTS. :
アッセンブリーパーツ :

02	OPERATION PANEL	UNIT L-KEY-19D/26	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
27	A100186	PSC-105#25	TRACK BALL MOUNTING PLATE		
28	A510003	SP-4103-uB	KNOB:STC		
29	A510002	SP-4104	KNOB		
30	A510011	SP-4106	KNOB		
31	A510012	SP-4107-1	KNOB		
32	A618000	L-TB-1B	TRACK BALL		
34	A611013	B3F-1050	KEY SWITCH(without KEY-TOP)		
35	A616014	EBR3432S	LED		
36	A601087	3428-6002LCSC	CONNECTOR		

※ means ASSEMBLY PARTS. .
アッセンブリーパーツ .

03	MONITOR ARM	UNIT L-Ki-490 / -501	S/N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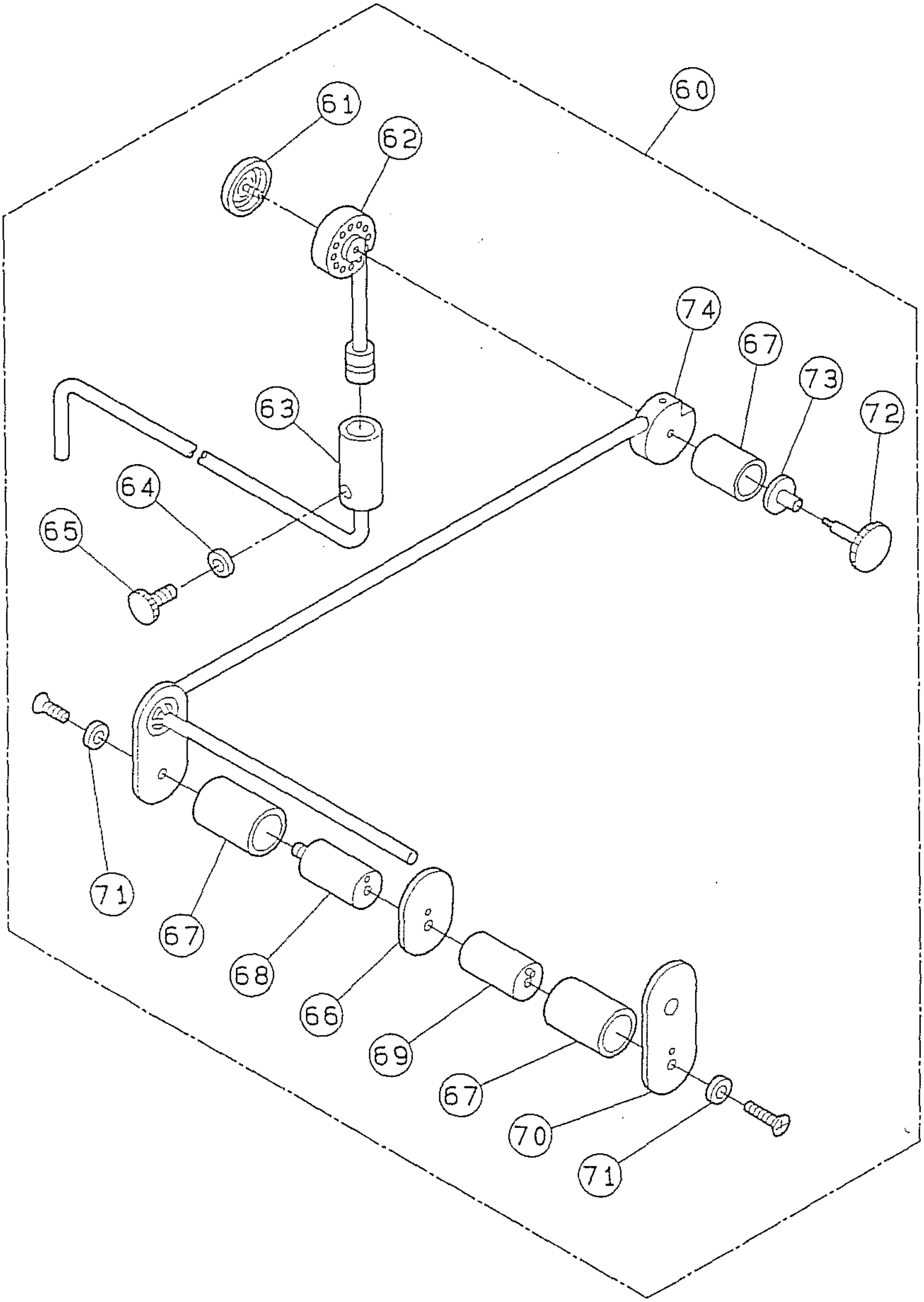
03	CABLE HANGER	UNIT MP-HA-680	S/N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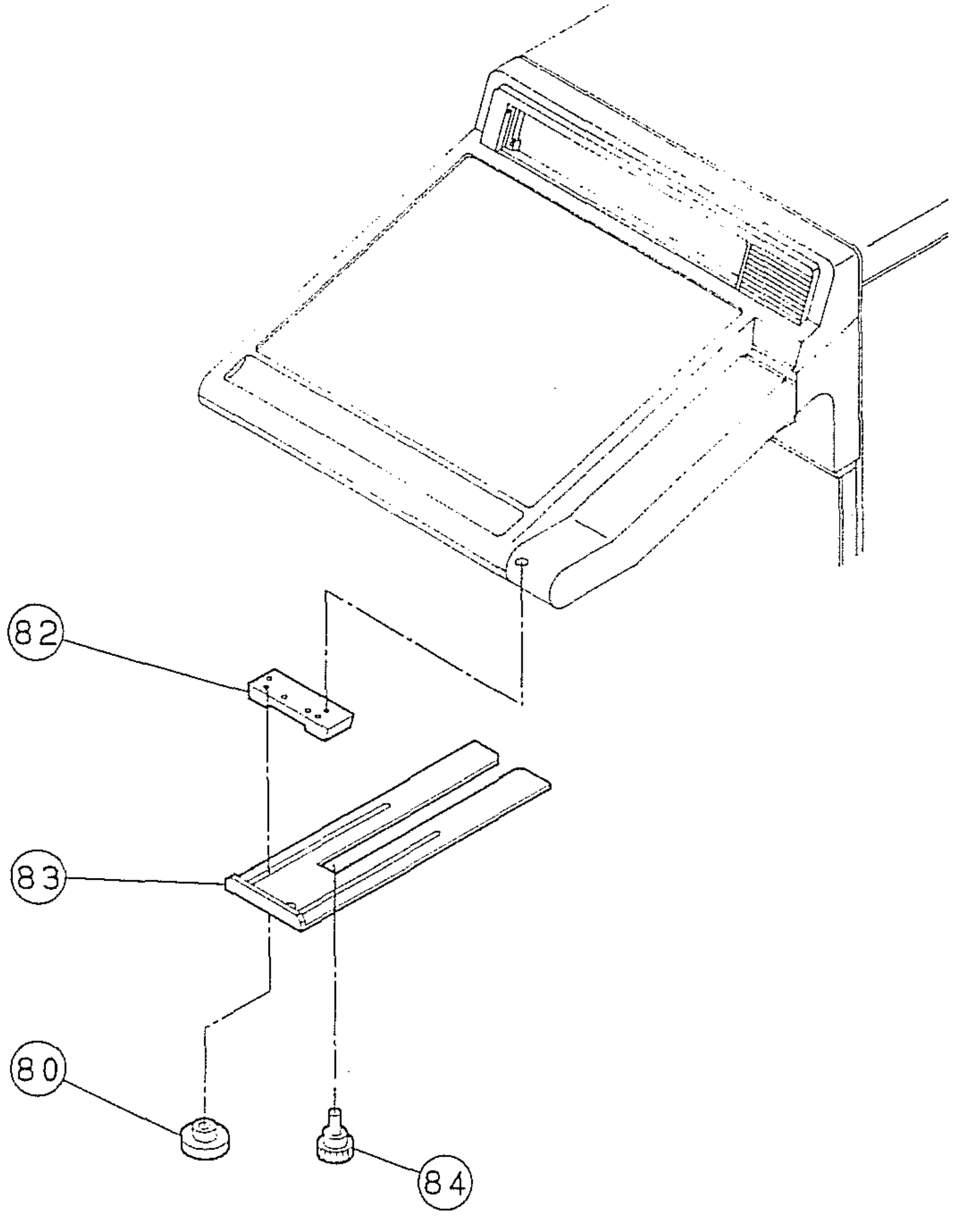
03	VTR REMOTE CONTROLLER RACK	UNIT MP-FX-680-3B	S/N



03	MACHINERY	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
1	A150045	L-Ki-279#1	MAIN EXTENSION SPRING		
2	A150011	L-Ki-279#2	SUB EXTENSION SPRING		
2	※A200416	L-Ki-279B#2	SUB EXTENTION SPRING		
3	※A200546	L-Ki-263B#3	MONITOR MOUNTING BRACE		FOR 12′ TV
3	※A200547	L-Ki-501#3	MONITOR MOUNTING BRACE		FOR 10′ TV
4	A150027	L-Ki-279#4	KNOB		
5	A150035	L-Ki-279#5	BASE		
6	A150039	L-Ki-279#6	SUPPORT		
7	A150040	L-Ki-279#7	COVER FIXING SHAFT		
8	A150041	L-Ki-279#8	LOCK PIN		
9	A150042	L-Ki-279#9	LOCK PIN KNOB		
11	A150002	L-Ki-279#11	LINK(A)		
12	A150003	L-Ki-279#12	HOOK SHAFT		
13	A150004	L-Ki-279#13	COVER FIXING BOSS		
14	A150005	L-Ki-279#14	COVER FIXING BRACE		
15	A150006	L-Ki-279#15	WASHER		
16	A150007	L-Ki-279#16	CONICAL SPRING WASHER		
17	A150008	L-Ki-279#17	NUT		
18	A150009	L-Ki-279#18	BUSH		
19	A150010	L-Ki-279#19	LINK(B)		
20	A150012	L-Ki-279#20	SCREW		
22	A150013	L-Ki-279#22	SPACER PLATE		
23	A150014	L-Ki-279#23	FRICTION PLATE		

※ means ASSEMBLY PARTS.
アッセンブリーパーツ

03	MACHINERY	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
24	A150015	L-Ki-279#24	FRICTION LINK		
25	A150016	L-Ki-279#25	TOP PLATE		
26	A150017	L-Ki-279#26	BOSS		
27	A150018	L-Ki-279#27	BOLT		
29	A150019	L-Ki-279#29	SCREW :ANK2.6※15		
30	A150021	L-Ki-279#30	HANDLE COVER MOUNTING BRACE		
34	A150022	L-Ki-279#34	HANDLE COVER:UPPER		
35	A150023	L-Ki-279#35	HANDLE COVER:LOWER		
36	A150024	L-Ki-279#36	SCREEN		
38	A150025	L-Ki-279#38	GROUND WIRE(A)		
39	A150026	L-Ki-279#39	GROUND WIRE(B)		
42	A150028	L-Ki-279#42	BALL PLUNGER		
43	A150029	L-Ki-279#43	RIGHT COVER		
44	A150030	L-Ki-279#44	LEFT COVER		
45	A150031	L-Ki-279#45	CAP		
47	A150032	L-Ki-279#47	HOCK PIN		
48	A150076	L-Ki-263#35	LAMP		
49	A150075	L-Ki-263#36	SWITCH		
50	※A200548	SAP-680EX-03-50	TILT TABLE		FOR 12′ TV
52	A000011	MP-IP05B	TILT TABLE		FOR 10′ TV
53	※A200549	L-Ki-409	MONITOR ARM ASSY		100V
53	※A200550	L-Ki-501	MONITOR ARM ASSY		115V, 220V
60	A800256	MP-HA680	CABLE HANGER FULL ASSY		

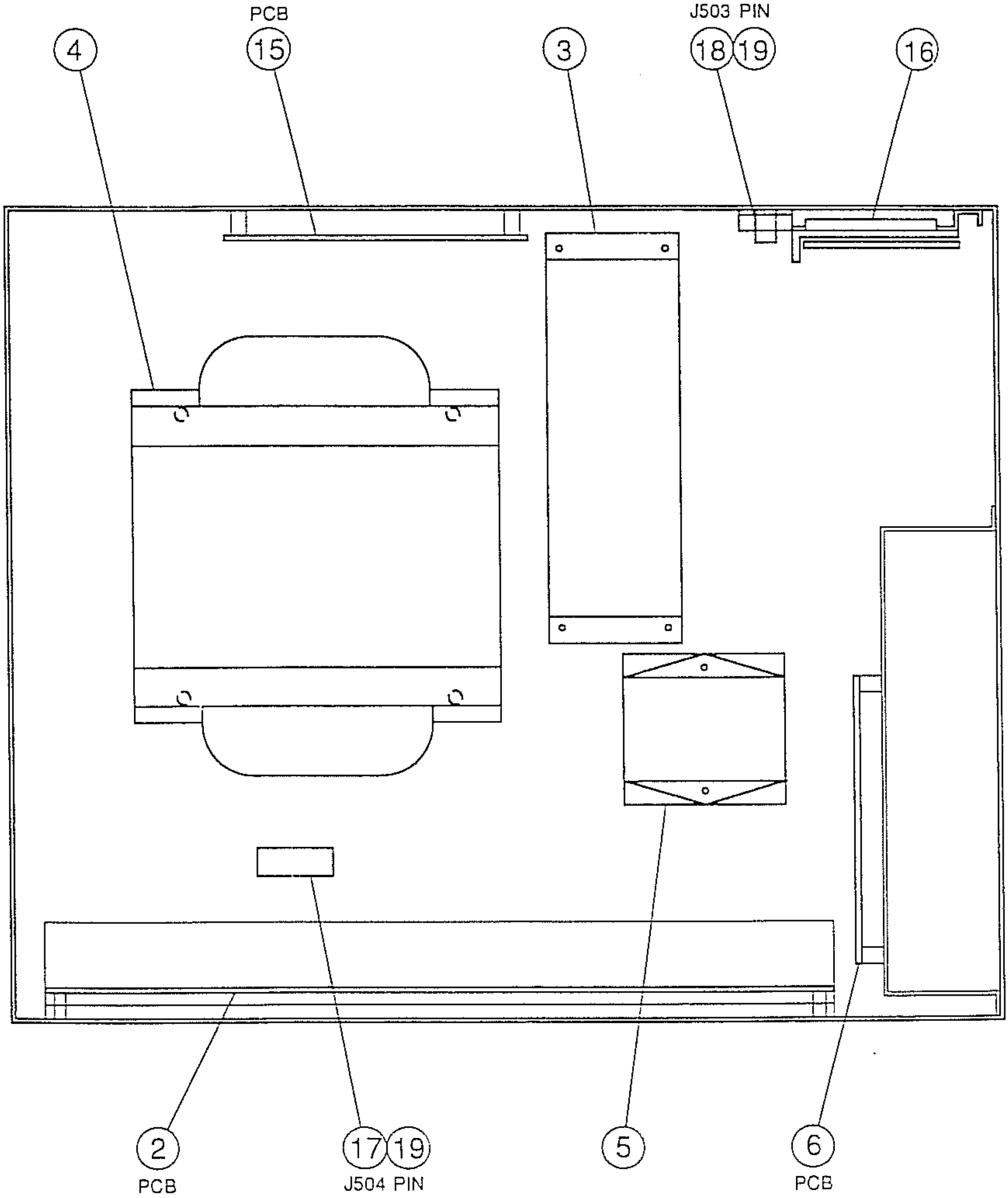
※ means ASSEMBLY PARTS. :
アッセンブリーパーツ :

03	MACHINERY	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
61	A120005	MP-HA600#2-4	CAP		
62	※A200557	SAP-600-04-11	JOINT ROD (2)		
63	※A200417	SAP-680-03-63	JOINT ROD (1)		
64	A110021	MP-HA600#1-6	CUSHION		
65	A110020	MP-HA600#1-5	LOCK KNOB		
66	A110029	MP-HA600#3-9	PARTITION PLATE		
67	A110024	MP-HA600#3-2	ROLLER(1)		
68	A110027	MP-HA600#3-7	SHAFT(1)		
69	※A200558	SAP-600-04-03	SHAFT(2)		
70	A110022	MP-HA600#3-10	MOUNTING BRACE		
71	A110023	MP-HA600#3-11	SURFACE WASHER		
72	A110026	MP-HA600#3-4	LOCK KNOB		
73	A110025	MP-HA600#3-3	ROLLER(2)		
74	※A200418	SAP-680-03-74	JOINT ASSY(C)		
80	A110013	MP-FX680-3#1	SPACER		
82	A110014	MP-FX680-3#2	MOUNTING BLOCK		
83	※A200551	SAP-680EX-03-83B	SLIDE PLATE		MP-FX680-3B
84	A140023	KS15※10A	KNOB		

※ means ASSEMBLY PARTS. .
アッセンブリーパーツ .

① UNIT ASSY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J503 PIN
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PCB
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J504 PIN
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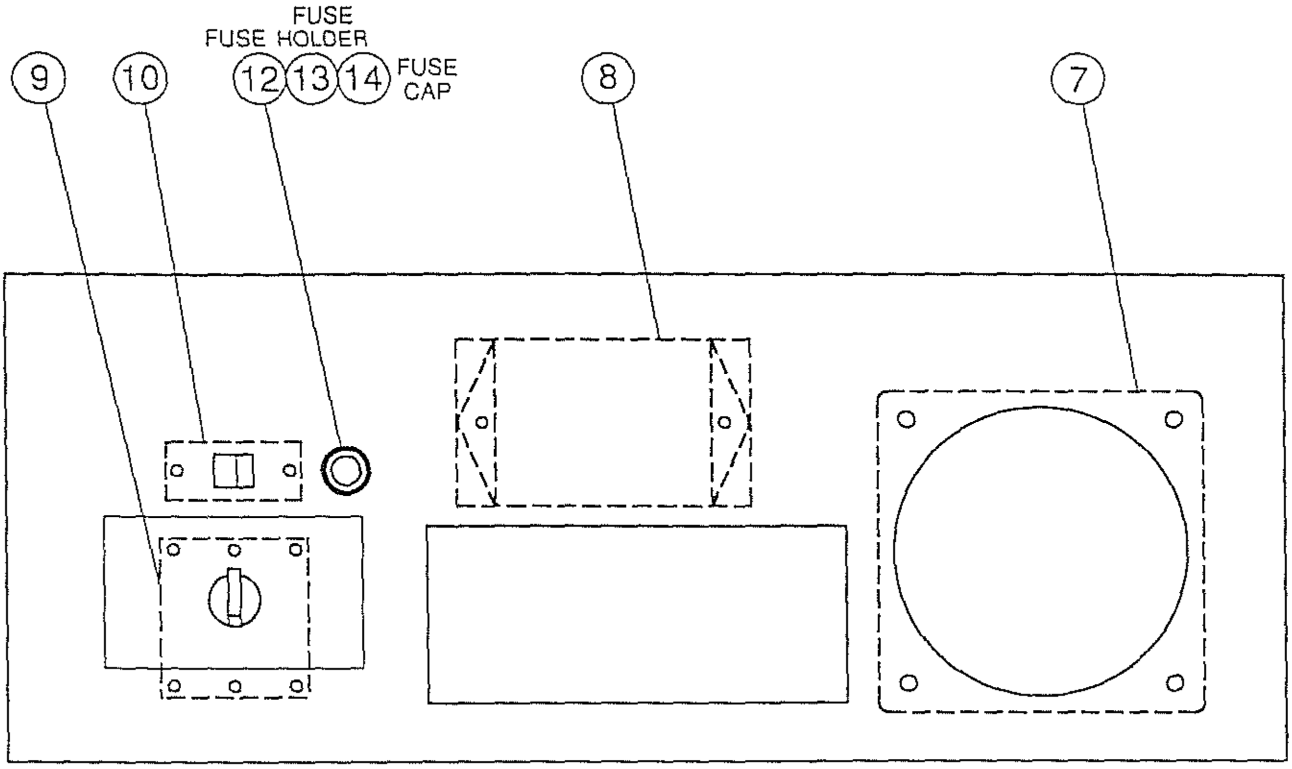
PCB

04	POWER SUPPLY UNIT	UNIT PSU-S680C	S/N

LEFT SIDE VIEW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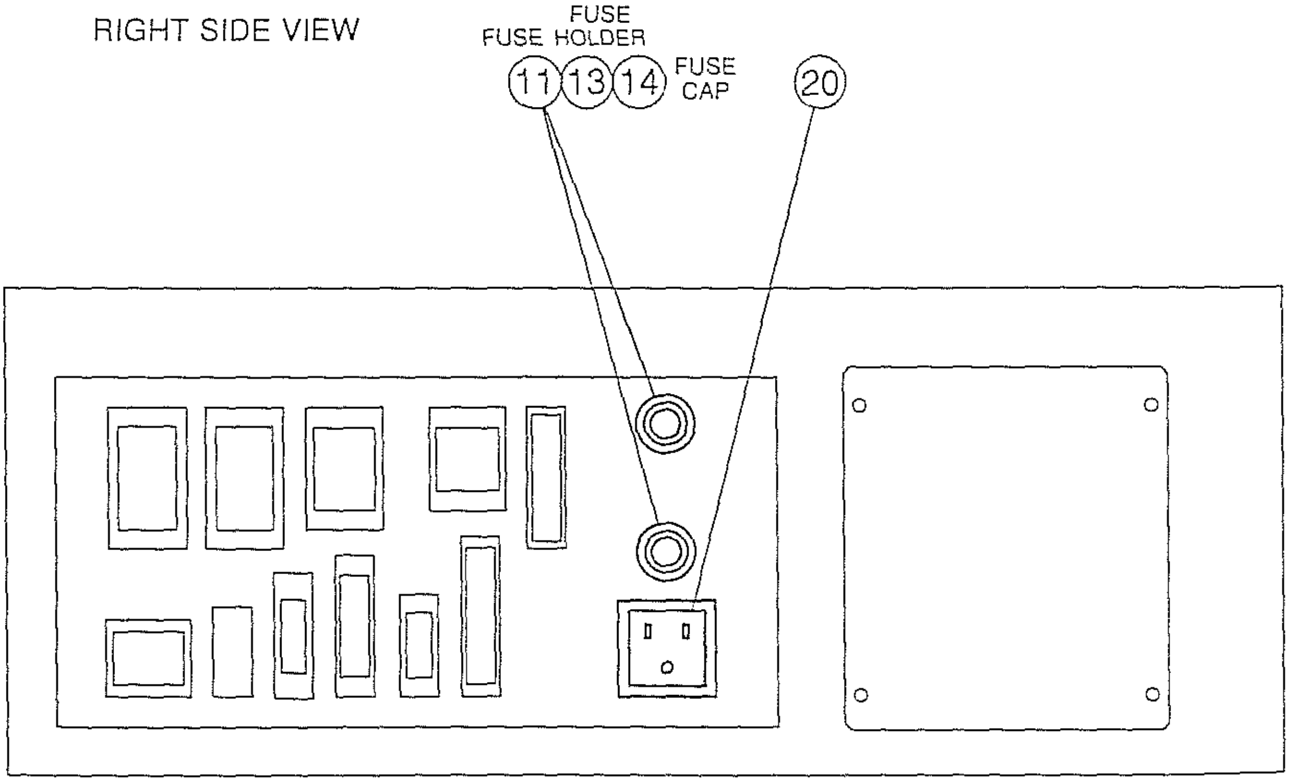
RIGHT SIDE VIEW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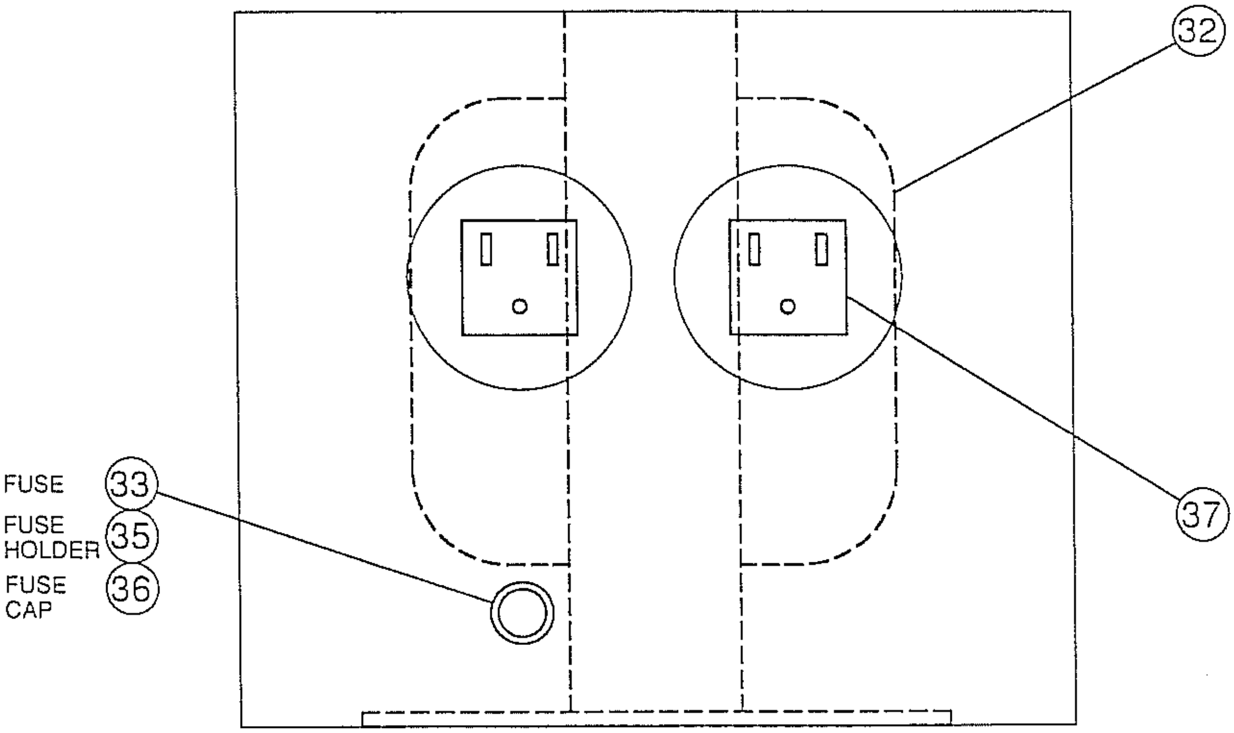
04	ISOLATION TRANSFORMER	UNIT PTU-004	S / N

㉚ UNIT ASSY (100V)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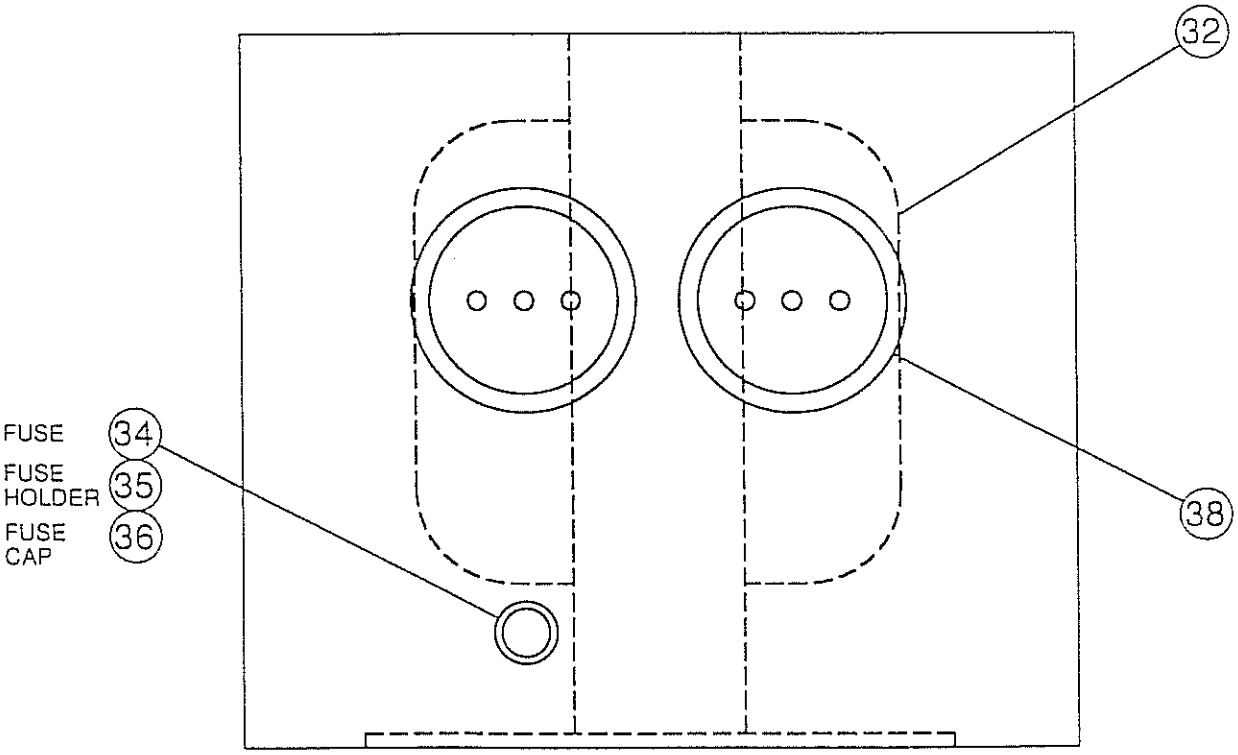
㉛ UNIT ASSY (200V)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04	POWER SUPPLY UNIT	UNIT PSU-S680C	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
1	A000012	PSU-S680C	UNIT ASSY		
2	A800988	EP-3240※	PCB		
3	A030019	HK12-5/A	SWITCHING POWER SUPPLY		
4	A606028	M-T-231	ISOLATION TRANSFORMER		
5	A606016	MBW-1205-22	LINE FILTER		
6	A800989	EP-3535※	PCB		
7	A625021	109P0924M406	FAN		
8	A606017	MAS-1220-33	LINE FILTER		
9	A621035	UB2-XLN-111-108E-15, 108E-15,108-6	BREAKER		
10	A611062	SU110A-11	VOLTAGE SELECTOR		
11	A621049	313 002	FUSE:F2, F501		
12	A621050	313 001	FUSE:F502		
13	A621022	FEU031-1673	FUSE HOLDER		
14	A621023	FEK031-1661	FUSE CAP		
15	A800421	EP-2922B	PCB		
16	A030020	SSG010-15	SWITCHING POWER SUPPLY		
17	A601019	1-480703-0	CONNECTOR:J504		
18	A601015	1-480764-0	CONNECTOR:J503		
19	A601077	350547-1	PIN CONTACT		
20	A601016	AC-G10BB44	AC OUTLET		
30	A030001	PTU-004	ISOLATION TRANSFORMER ASSY		FOR 100V
31	A030001	PTU-004	ISOLATION TRANSFORMER ASSY		FOR 200V
32	A606034	M-T-133B	ISOLATION TRANSFORMER		

※ means ASSEMBLY PARTS. :
アッセンブリーパーツ :

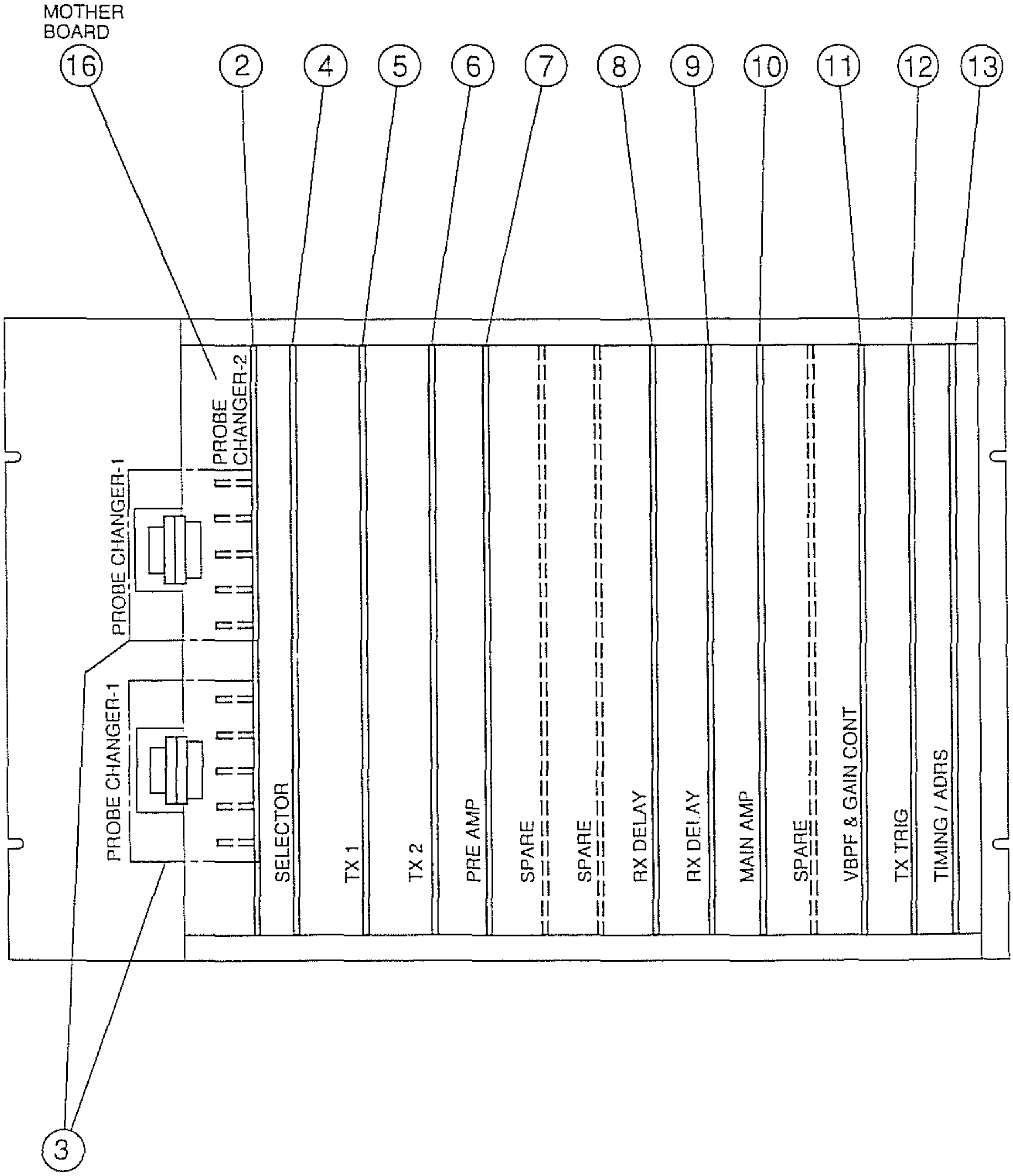
04	POWER SUPPLY UNIT	UNIT PSU-S680C	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
33	A621047	326.01 0	FUSE		FOR 100V
34	A621048	313.005	FUSE		FOR 200V
35	A621022	FEU031-1673	FUSE HOLDER		
36	A621023	FEK031-1661	FUSE CAP		
37	A601016	AC-G10BB44	AC OUTLET		FOR 100V
38	A601058	418037	AC OUTLET		FOR 200V

＊ means ASSEMBLY PARTS.
アッセンブリーパーツ

05	PCB UNIT	UNIT GEU-64	S/N

① UNIT ASSY


MOTHER BOARD
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PROBE CHANGER-2
PROBE CHANGER-1
PROBE CHANGER-1
SELECTOR
TX 1
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PRE AMP
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SPARE
RX DELAY
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VBPF & GAIN CONT
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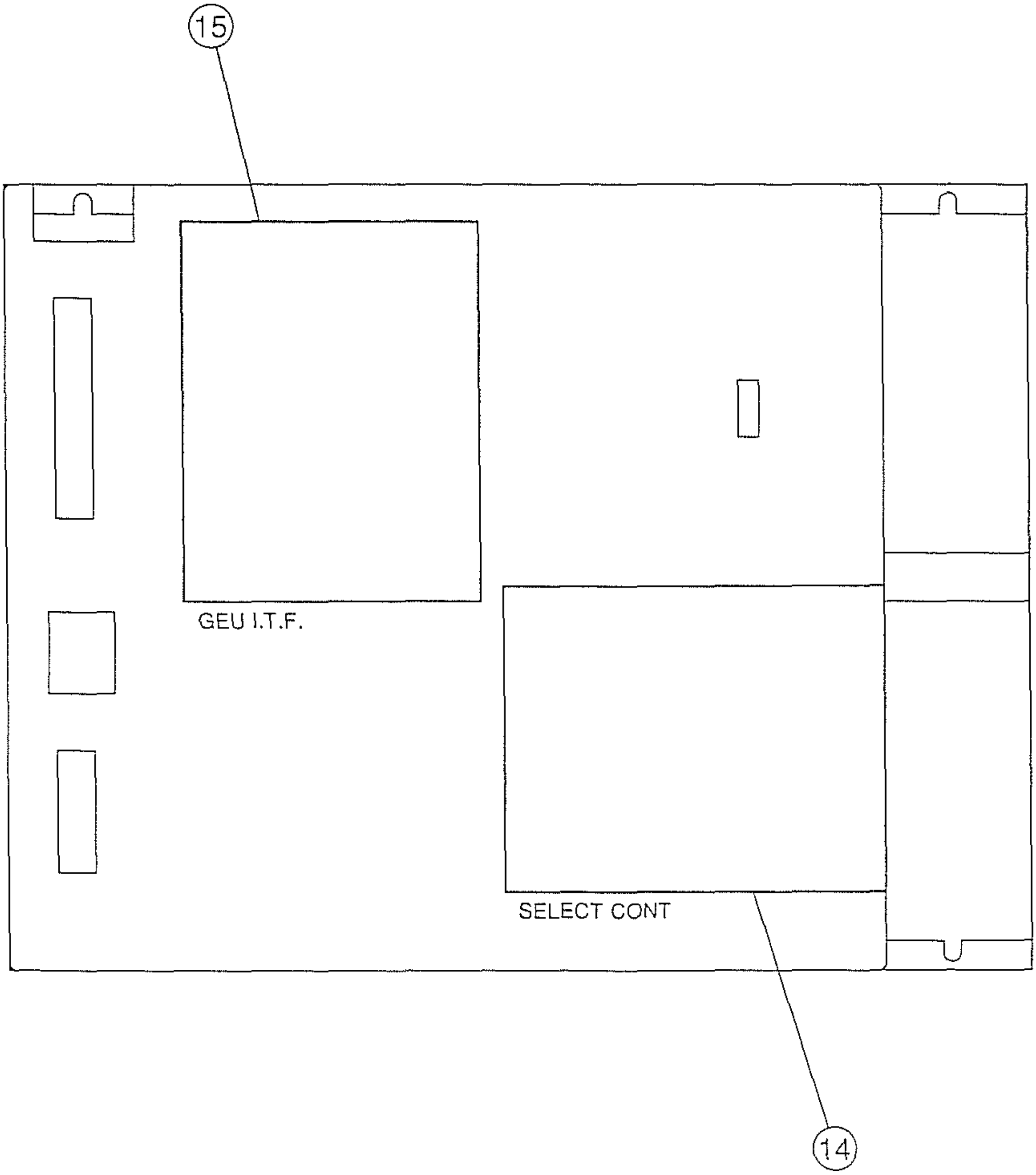
TIMING / ADRS

05	PCB UNIT	UNIT GEU-64	S / N

MOTHER BOARD SIDE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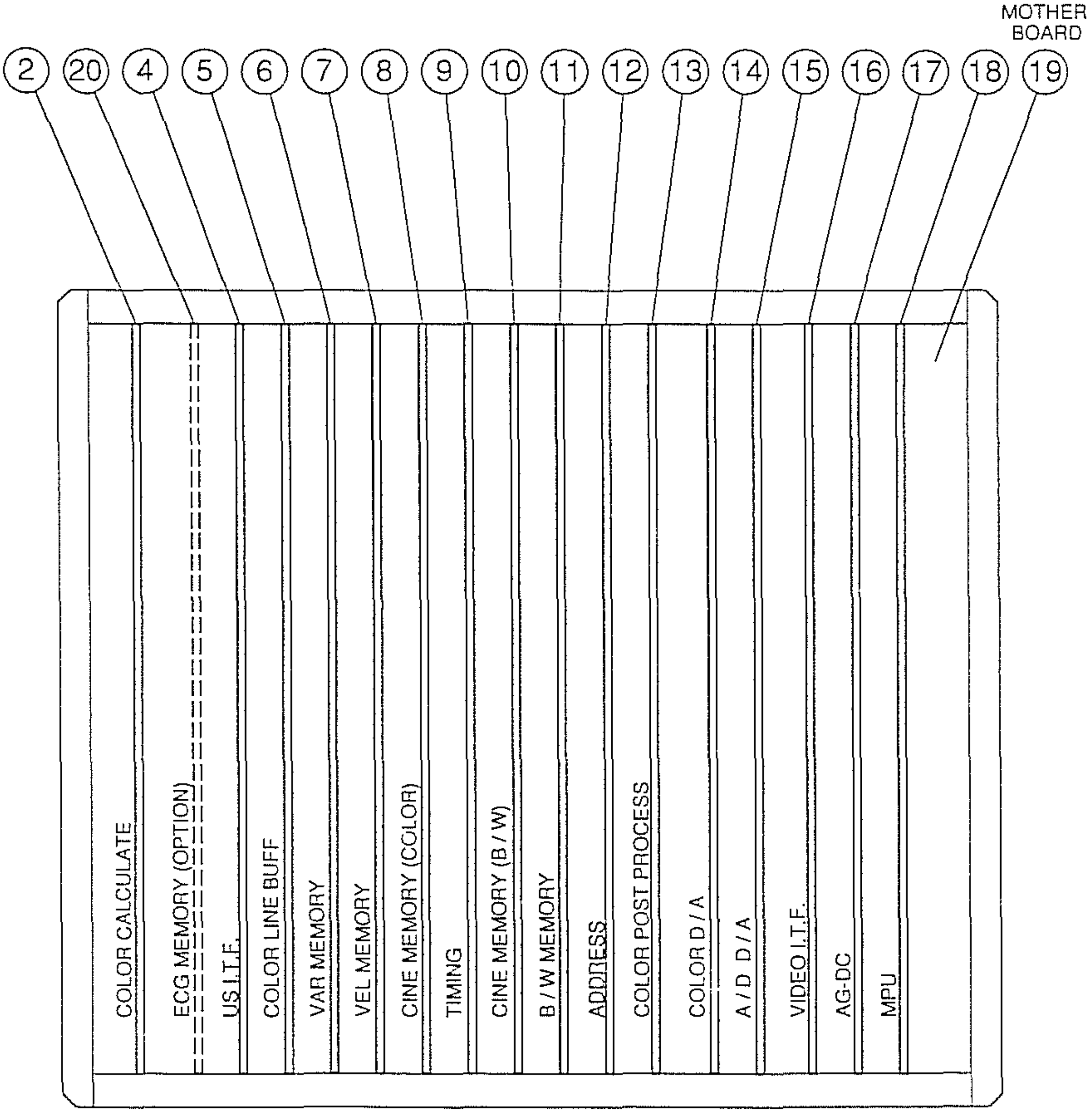
GEU I.T.F.
SELECT CONT
14

05	PCB	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
1	A000013	GEU-64	UNIT ASSY		
2	A800950	EP-3454	PCB:PROBE CHANGER-2		
3	A800951	EP-3453Σ	PCB:PROBE CHANGER-1		
4	A800952	EP-3455	PCB:SELECTOR		
5	A800953	EP-3456	PCB:TX 1		
6	A800954	EP-3457	PCB:TX 2		
7	A800955	EP-3458	PCB:PRE AMP		
8	A800956	EP-3459	PCB:RX DELAY		
9	A800956	EP-3459	PCB:RX DELAY		
10	A800957	EP-3461	PCB:MAIN AMP & COLOR I.T.F		
11	A800958	EP-3463	PCB:GAIN CONT		
12	A800959	EP-3464	PCB:TX TRIG		
13	A800960	EP-3465	PCB:TIMING/ADRS		
14	A800961	EP-3452	PCB:SELECT CONT		
15	A800962	EP-3525	PCB:GEU I.T.F.		
16	A800963	EP-3466	PCB:MOTHER BOARD		

※ means ASSEMBLY PARTS. .
アッセンブリーパーツ .

① UNIT ASSY


MOTHER BOARD
②
⑳
④
⑤
⑥
⑦
⑧
⑨
⑩
⑪
⑫
⑬
⑭
⑮
⑯
⑰
⑱
⑲
COLOR CALCULATE
ECG MEMORY (OPTION)
US I.T.F.
COLOR LINE BUFF
VAR MEMORY
VEL MEMORY
CINE MEMORY (COLOR)
TIMING
CINE MEMORY (B / W)
B / W MEMORY
ADDRESS
COLOR POST PROCESS
COLOR D / A
A / D D / A
VIDEO I.T.F.
AG-DC
MPU

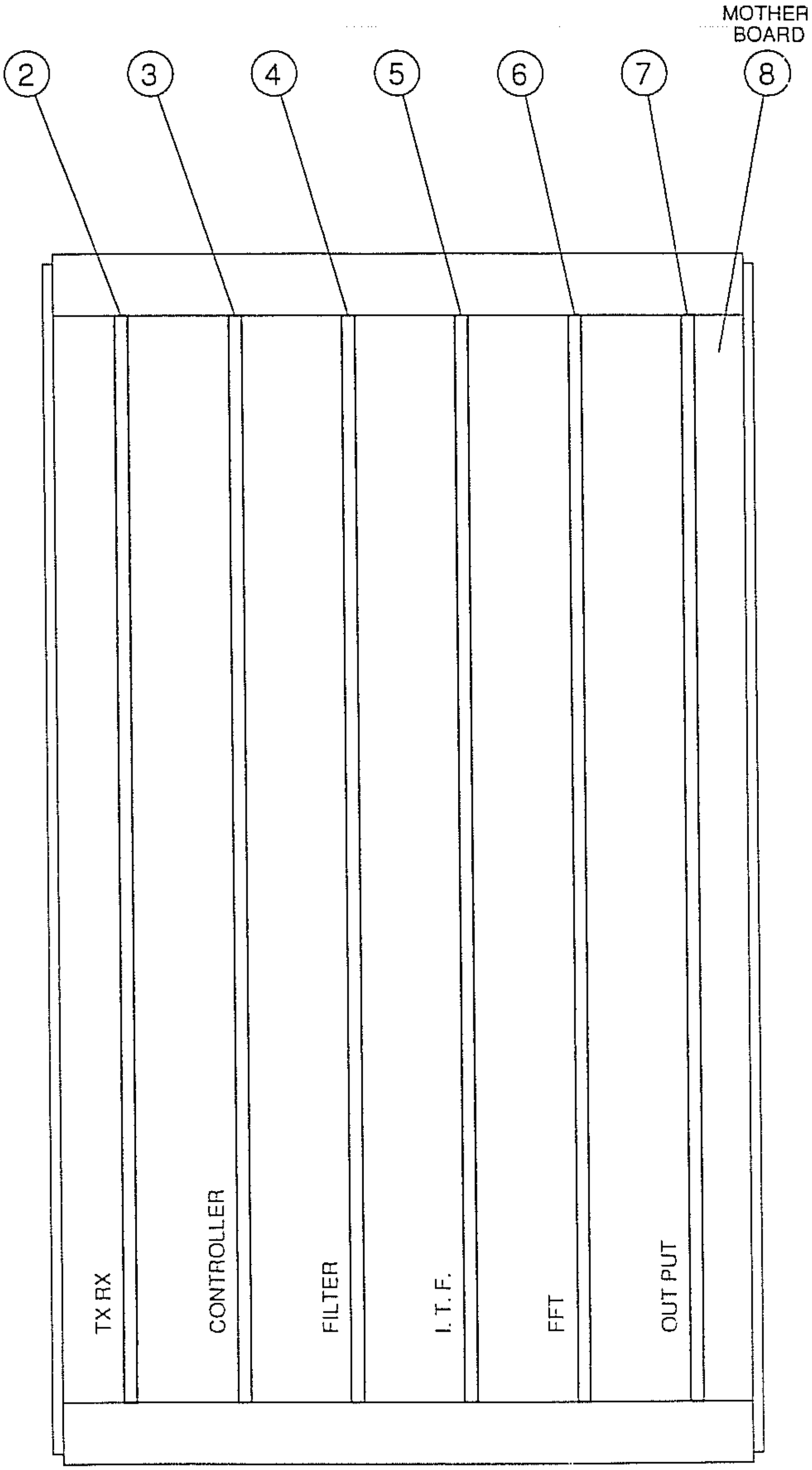
06	PCB	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
1	A800964	UIM-325	UNIT ASSY		
2	A800965	EP-5100	PCB:COLOR CALCULATE		
4	A800966	EP-3477	PCB:US I.T.F		
5	A800150	EP-3115	PCB:COLOR LINE BUFF		
6	A800967	EP-2213-1	PCB:VAR MEMORY		
7	A800149	EP-2213	PCB:VEL MEMORY		
8	A800968	EP-3238	PCB:CINE MEMO(COLOR)		
9	A800969	EP-3620	PCB:TIMING		
10	A800970	EP-3237	PCB:CINE MEMO(B/W)		
11	A800971	EP-3247	PCB:B/W MEMORY		
12	A800972	EP-3236	PCB:ADDRESS		
13	A800152	EP-3114	PCB:COLOR POST PROCES		
14	A800973	EP-2651-2	PCB:COLOR D/A		
15	A800919	EP-2729	PCB:A/D D/A		
16	A800927	EP-3443	PCB:VIDEO I.T.F.		FOR NTSC
16	A800927	EP-3443	PCB:VIDEO I.T.F.		FOR PAL
17	A800929	EP-2629	PCB:AG-DC		
18	A800167	EP-2913-1	PCB:MPU		
19	A800974	EP-3467	PCB:MOTHER BOARD		
20	A800975	EP-2841	PCB:ECG MEMORY		FOR PEU-680B

※ means ASSEMBLY PARTS. .
アッセンブリーパーツ .

07	PCB UNIT	UNIT UGR-680	S / N

① UNIT ASSY

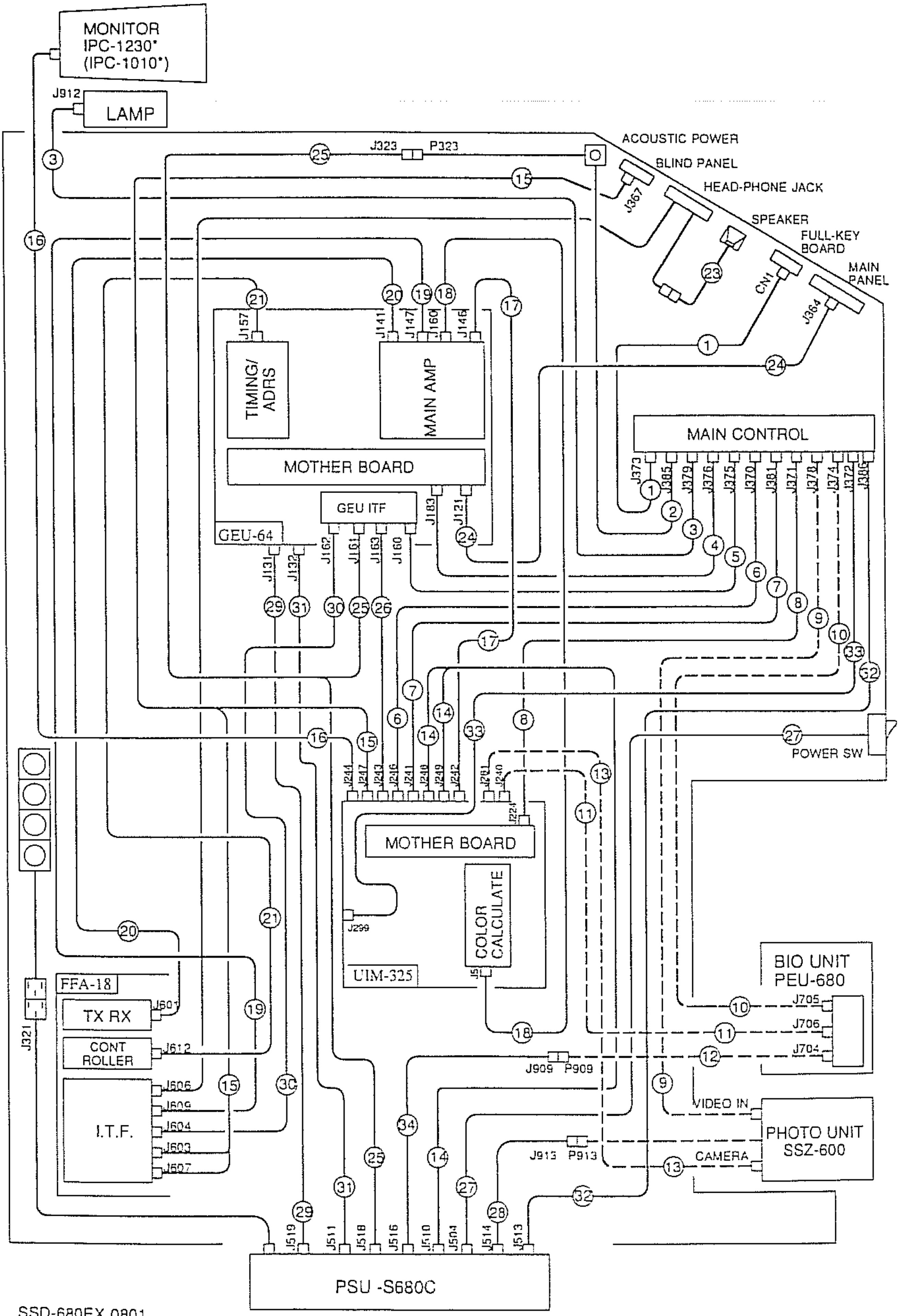

MOTHER
BOARD
②
③
④
⑤
⑥
⑦
⑧
TX RX
CONTROLLER
FILTER
I. T. F.
FFT
OUT PUT

07	PCB	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
1	A800976	UGR-680	UNIT ASSY		
2	A800977	EP-3260	PCB:TX,RX		
3	A800939	EP-2810	PCB:CONTROLLER		
4	A800978	EP-3259	PCB:FILTER		
5	A800941	EP-2812	PCB:I.T.F.		
6	A650003	NJK-196A-FFT	PCB:FFT BOARD		
7	A800990	NJK-196A-OUT PUT	PCB:OUT PUT BOARD		
8	A800178	EP-2808	PCB:MOTHER BOARD		

* means ASSEMBLY PARTS. .
アッセンブリーパーツ .

08	CABLE	UNIT PSC-118	S / N


MONITOR
IPC-1230*
(IPC-1010*)
J912
LAMP
ACOUSTIC POWER
BLIND PANEL
HEAD-PHONE JACK
SPEAKER
FULL-KEY BOARD
MAIN PANEL
J323
P323
J367
CN1
J364
J157
J141
J147
J160
J146
TIMING/ ADRS
MAIN AMP
MOTHER BOARD
GEU ITF
GEU-64
J183
J121
J131
J132
J162
J161
J163
J160
MAIN CONTROL
J373
J385
J379
J376
J375
J370
J381
J371
J378
J374
J372
J386
POWER SW
J244
J247
J243
J246
J241
J248
J249
J242
J281
J240
J224
MOTHER BOARD
COLOR CALCULATE
J299
UIM-325
J5
BIO UNIT
PEU-680
J705
J706
J704
J909
P909
VIDEO IN
PHOTO UNIT
SSZ-600
CAMERA
J913
P913
FFA-18
TX RX
J601
CONT ROLLER
J612
I.T.F.
J606
J609
J604
J603
J607
J321
J519
J511
J518
J516
J510
J504
J514
J513
PSU -S680C
①
②
③
④
⑤
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⑩
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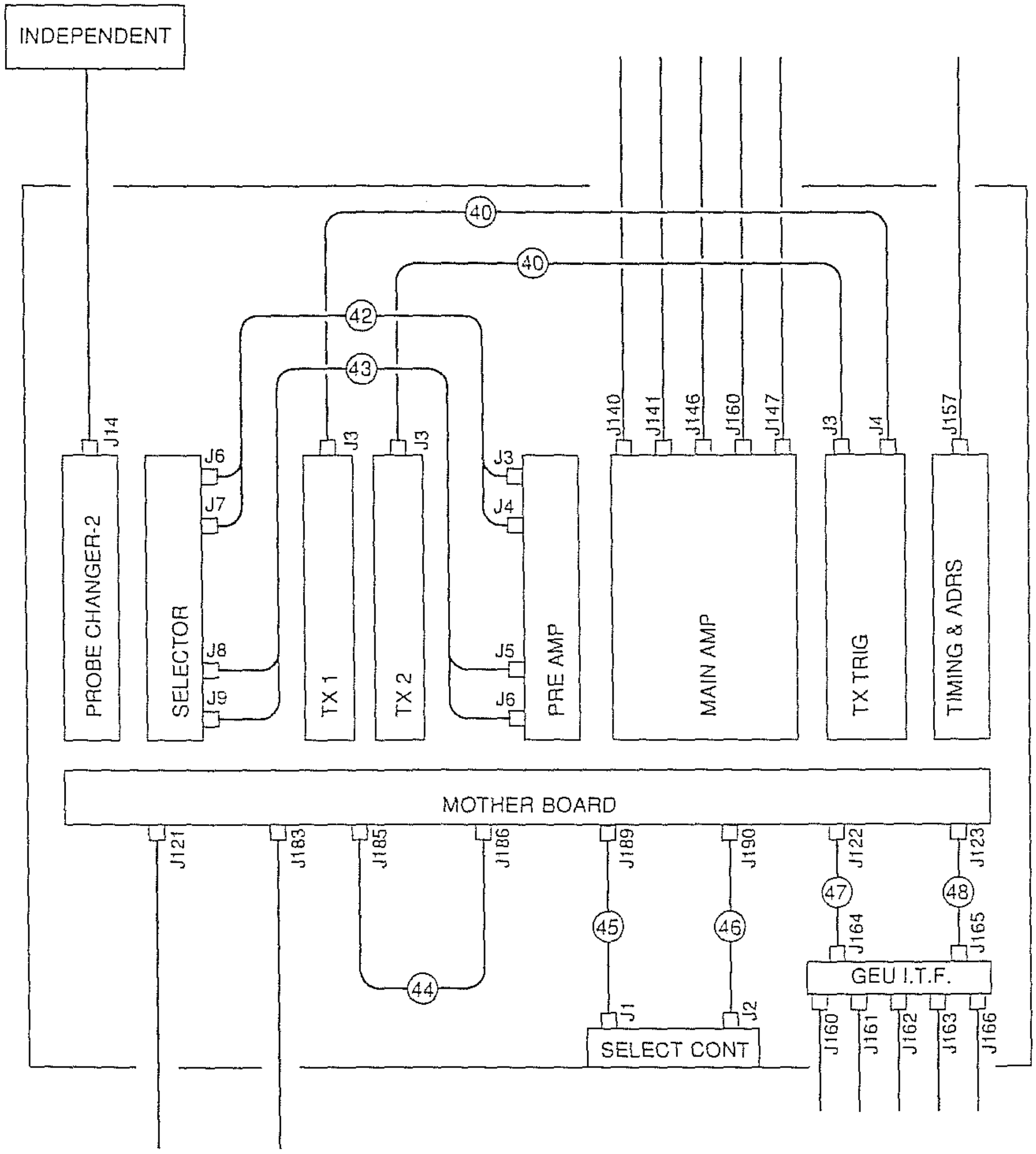
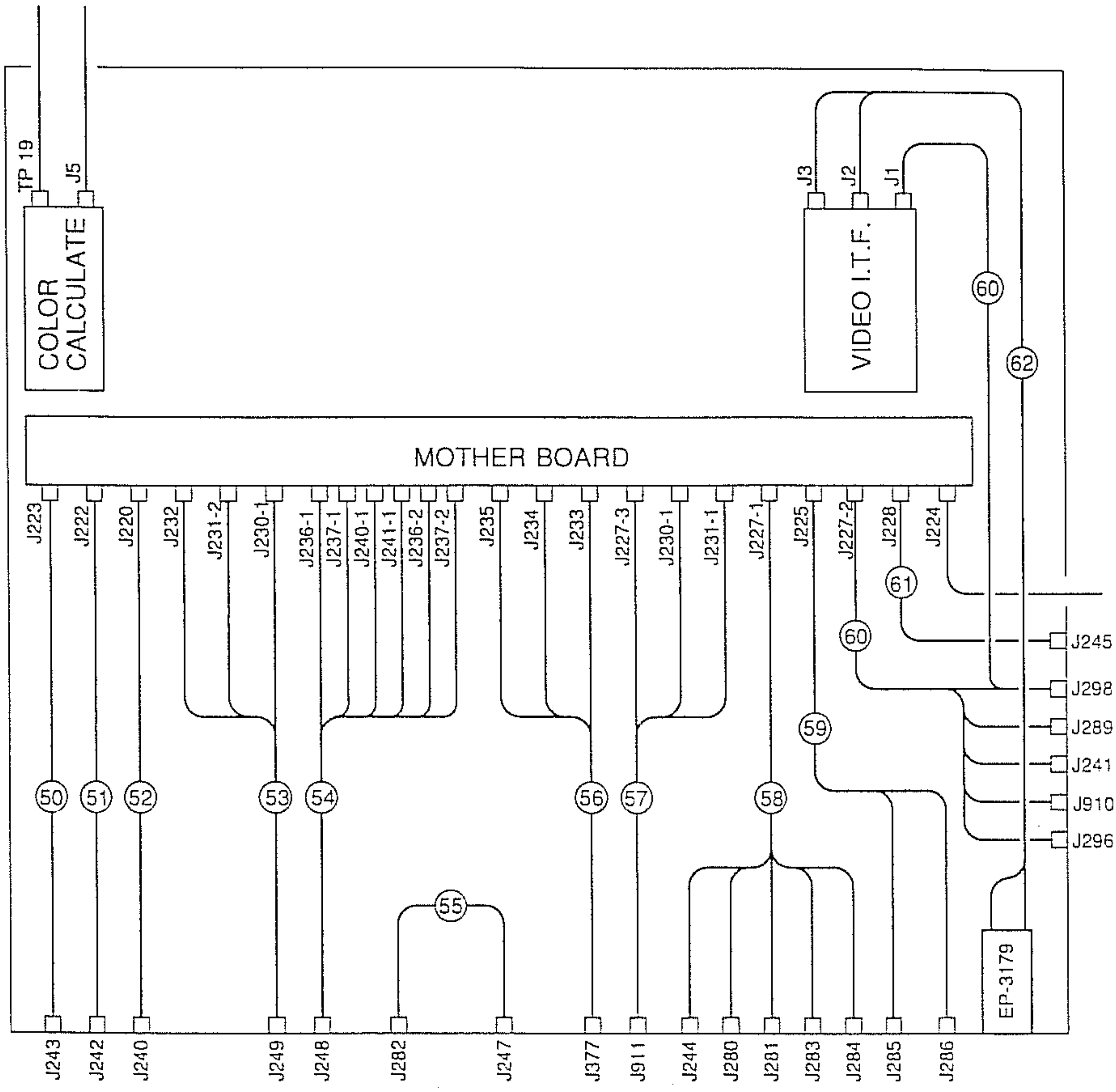
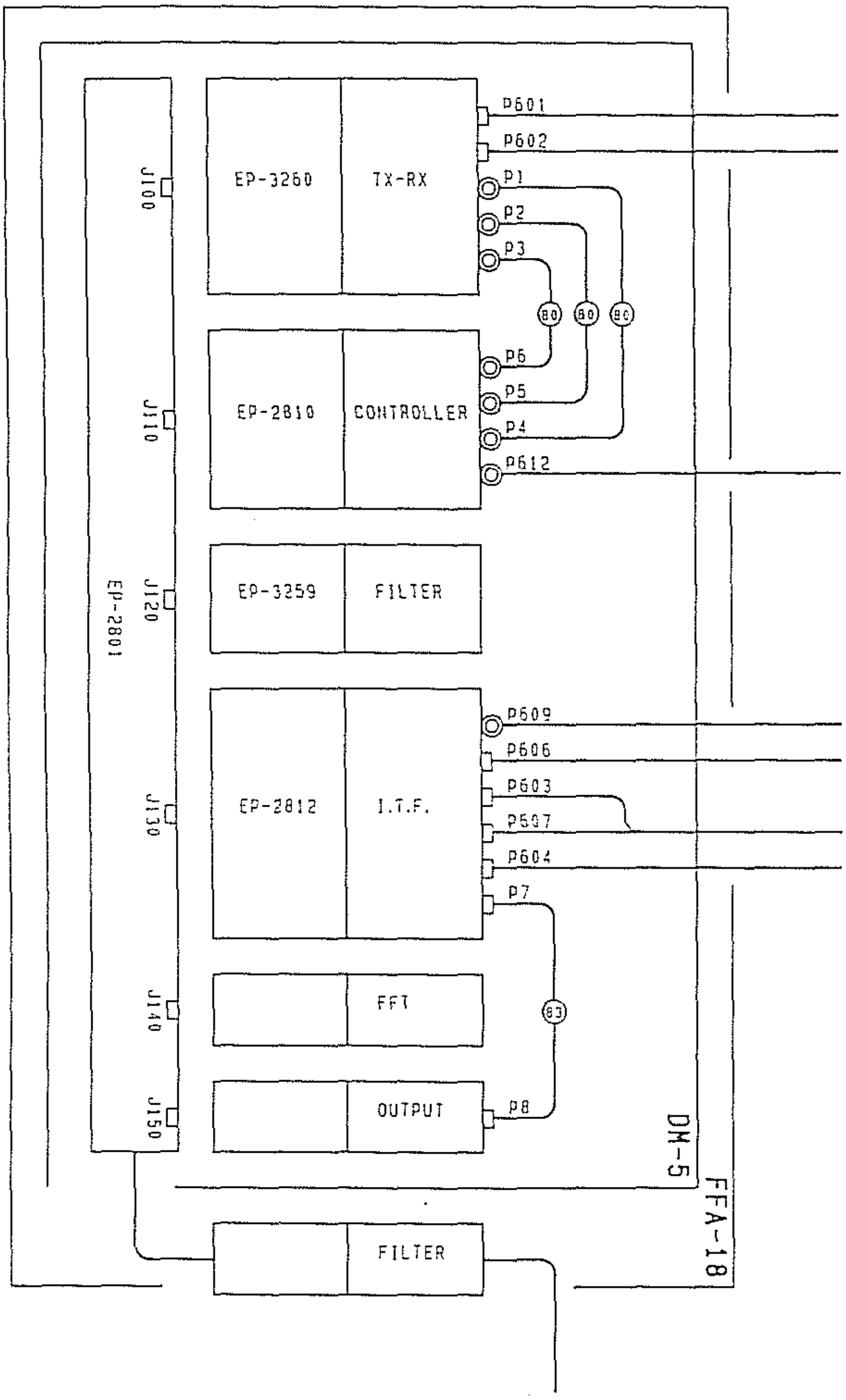
TX / RX UNIT : GEU-64


INDEPENDENT
40
40
42
43
J14
J6
J7
J3
J3
J3
J4
J140
J141
J146
J160
J147
J3
J4
J157
PROBE CHANGER-2
SELECTOR
J8
J9
TX 1
TX 2
J5
J6
PRE AMP
MAIN AMP
TX TRIG
TIMING & ADRS
MOTHER BOARD
J121
J183
J185
J186
J189
J190
J122
J123
47
48
45
46
J164
J165
GEU I.T.F.
44
J1
J2
SELECT CONT
J160
J161
J162
J163
J166

DSC UNIT : UIM-325


TP 19
J5
COLOR CALCULATE
J3
J2
J1
VIDEO I.T.F.
MOTHER BOARD
J223
J222
J220
J232
J231-2
J230-1
J236-1
J237-1
J240-1
J241-1
J236-2
J237-2
J235
J234
J233
J227-3
J230-1
J231-1
J227-1
J225
J227-2
J228
J224
(50)
(51)
(52)
(53)
(54)
(55)
(56)
(57)
(58)
(59)
(60)
(61)
(60)
(62)
J245
J298
J289
J241
J910
J296
EP-3179
J243
J242
J240
J249
J248
J282
J247
J377
J911
J244
J280
J281
J283
J284
J285
J286

DOPPLER UNIT
UGR-680


EP-2801
J100
J110
J120
J130
J140
J150
EP-3260
TX-RX
P601
P602
P1
P2
P3
80
80
8C
EP-2810
CONTROLLER
P6
P5
P4
P612
EP-3259
FILTER
EP-2812
I.T.F.
P609
P606
P603
P507
P604
P7
83
FFT
OUTPUT
P8
DM-5
FFA-18
FILTER

08	CABLE	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
1	A800213	CO-PSC108-L-06	CABLE:J373-CN1	～	
2	A800991	CO-PSC-108-D-09	CABLE:J385-J323, ACOUSTIC POWER	～	
3	A800992	CO-PSC118-A 12	CABLE:J379-J912, LAMP	～	
4	A800993	CO-GEU64-J05	CABLE:J183-J376	～	
5	A800994	CO-GEU64-G04	CABLE:J375-J160	～	
6	A800216	CO-PSC108-P-08	CABLE:J370-J246	～	
7	A800215	CO-PSC108-F-08	CABLE:J381-J241	～	
8	A800995	CO-PSC108-J-08B	CABLE:J371-J224	～	
9	A800218	CO-PSC108-E-15	CABLE:J378-P700, CAMERA	～	
10	A800996	CO-PSC-108-K-04	CABLE:J705-J374	～	
11	A800997	CO-PSC-108-M-08	CABLE:J706-J240	～	
12	A800225	CO-PEU680-A-02	CABLE:J704-P909	～	
13	A800227	CO-PSC108-Q-05	CABLE:J281-J703, VIDEO IN	～	
14	A800998	CO-L-PS-40-F-07	CABLE:J510-J248, J249	～	
15	A800223	CO-PSC108-S-18	CABLE:J603-J367, 247-J607	～	
16	※A200560	L-CABLE301-16	CABLE:J244-P1000, MONITOR	～	
17	A800999	CO-GEU64-S-10	CABLE:J242-J146	～	
18	A801000	CO-GEU64-F05	CABLE:J5-J160	～	
19	A800799	CO-GEU50-K-10	CABLE:J147-J609	～	
20	A800798	CO-GEU50-J-08	CABLE:J601-J141	～	
21	A800234	CO-GEU50-N-10	CABLE:J612-J157	～	
23	A801001	CO-PSC108-H08	CABLE:J342-SPEAKER	～	
24	A801002	CO-GEU50-W-08	CABLE:J364-J121	～	

※ means ASSEMBLY PARTS. :
アッセンブリーパーツ :

08	CABLE	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
25	A800797	CO-PSC-108-A-13	CABLE:J518-J161, J323	～	
26	A800979	CO-GEU-50Y-4	CABLE:J163-J243		
27	A801003	CO-LPS-40-E-14	CABLE:J504-S300, SW	～	
28	A800228	CO-LPS40-H-10	CABLE:J913-J514	～	
29	A801004	CO-LPS-40-G-12	CABLE:J519-J131	～	
30	※A200561	L-CABLE-177-11	CABLE:J604-J162	～	
31	A801005	CO-LPS-40-B-13	CABLE:J511-J132		
32	A800217	CO-LPS40-A-12	CABLE:J386-J513	～	
33	※A200552	L-CABLE-341	CABLE:J299-J372		
34	A800226	CO-LPS40-D-12	CABLE:J909-J516	～	
40	※A200562	L-CABLE-392	CABLE:J3-J4, J3-J3	～	
42	A801006	CO-GEU64-A05	CABLE:J6, J7-J3, J4	～	
43	A801007	CO-GEU64-B05	CABLE:J8, J9-J5, J6	～	
44	A801008	CO-GEU64-M01	CABLE:J185-J186	～	
45	A801009	CO-GEU64-Q02	CABLE:J1-J189	～	
46	A801010	CO-GEU64-R02	CABLE:J2-J190	～	
47	A801011	CO-GEU64-K04	CABLE:J122-J164	～	
48	A801012	CO-GEU64-L04	CABLE:J123-J165	～	
50	A800804	CO-UIM324-D-05	CABLE:J223-J243	～	
51	A800803	CO-UIM324-C-04	CABLE:J222-J242	～	
52	A800801	CO-UIM324-A-04	CABLE:J220-J240	～	
53	A800810	CO-UIM324-J-04	CABLE:J249-J230-2, J231-2, J232	～	
54	A800809	CO-UIM324-I-04	CABLE:J248-J236,J237-2,J236-1,J237-1,J240-1,J241-1	～	

※ means ASSEMBLY PARTS.
アッセンブリーパーツ

08	CABLE	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
55	A800812	CO-UIM324-M-03B	CABLE:J247-J282	~	
56	A801013	CO-UIM325-A-04	CABLE:J377-J233, J234, J235	~	
57	A800246	CO-UIM324-0-08	CABLE:J911, J231-1, J230-1, J227-3	~	
58	A801014	CO-UIM324-L-06C	CABLE:J227-1-J280,J281, J283,J284,J244	~	
59	A800805	CO-UIM324-E-04	CABLE:J225-J286, J285	~	
60	A800815	CO-UIM324-N-04B	CABLE:J241-J910,J289,J -298,J1,J277-2,J296	~	
61	※A200563	L-CABLE-175	CABLE:J228-J245	~	
62	A800816	CO-UIM324-P-05	CABLE:J3, J2-EP-3179	~	
80	A800207	NCS-3305	CABLE:J1-J4, J2-J5, J3-J6	~	
83	A800208	L-CABLE-222-06	CABLE:J7-J8	~	

※ means ASSEMBLY PARTS.
アッセンブリーパーツ

09	SCREWS & SMALL PARTS	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
	A341325	3T3※2. 5	SCREW HEXAGONAL:3T3※2. 5		
	A341304	3T3※4	SCREW HEXAGONAL:3T3※4		
	A341408	3T4※8	SCREW HEXAGONAL:3T4※8		
	A301306	ANK3※6	SCREW:ANK3※6		
	A301308	ANK3※8	SCREW:ANK3※8		
	A301418	ANK4※18	SCREW:ANK4※18		
	A140092	ARC-68-A-14	CABLECLAMP:INDEX 03		
	A342616	B6※16	BOLT HEXAGONAL:B6※16		
	A342620	B6※20	BOLT HEXAGONAL:B6※20		
	A342820	B8※20	BOLT HEXAGONAL:B8※20		
	A316306	BK3※6	SCREW:BK3※6		
	A303310	BNK3※10	SCREW:BNK3※10		
	A304316	BNK3※16Bs	SCREW:BNK3※16Bs		
	A303320	BNK3※20	SCREW:BNK3※20		
	A303330	BNK3※30	SCREW:BNK3※30		
	A303306	BNK3※6	SCREW:BNK3※6		
	A304306	BNK3※6Bs	SCREW:BNK3※6Bs		
	A303308	BNK3※8	SCREW:BNK3※8		
	A304308	BNK3※8Bs	SCREW:BNK3※8Bs		
	A303412	BNK4※12	SCREW:BNK4※12		
	A304408	BNK4※8Bs	SCREW:BNK4※8Bs		
	A140089	CKN-07	CABLECLAMP:INDEX 01		
	A306306	CNK3※6	SCREW:CNK3※6		

※ means ASSEMBLY PARTS.
アッセンブリーパーツ

09	SCREWS & SMALL PARTS	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
	A306308	CNK3※8	SCREW:CNK3※8		
	A305308	CNK3※8Bs	SCREW:CNK3※8Bs		
	A306410	CNK4※10	SCREW:CNK4※10		
	A306425	CNK4※25	SCREW:CNK4※25		
	A306408	CNK4※8	SCREW:CNK4※8		
	A140093	CV-100	CABLECLAMP:INDEX 05		
	A140094	CV-200	CABLECLAMP:INDEX 05, 06		
	A622007	FCN3010	CABLECLAMP:INDEX 05		
	A347406	HB4※6	SCREW:HB4※6		
	A347516	HB5※16	SCREW:HB5※16		
	A140095	KD-3N	CABLECLAMP:INDEX 04		
	A140065	KD-6N	CABLECLAMP:INDEX 05, 04		
	A381103	N3	NUT HEXAGONAL:N3		
	A381703	N3Bs	NUT HEXAGONAL:N3Bs		
	A381104	N4	NUT HEXAGONAL:N4		
	A381106	N6	NUT HEXAGONAL:N6		
	A311310	NK3※10	SCREW:NK3※10		
	A312310	NK3※10Bs	SCREW:NK3※10Bs		
	A311312	NK3※12	SCREW:NK3※12		
	A312312	NK3※12Bs	SCREW:NK3※12Bs		
	A311316	NK3※16	SCREW:NK3※16		
	A311325	NK3※25	SCREW:NK3※25		
	A311305	NK3※5	SCREW:NK3※5		

※ means ASSEMBLY PARTS.
アッセンブリーパーツ

09	SCREWS & SMALL PARTS	UNIT	S/N

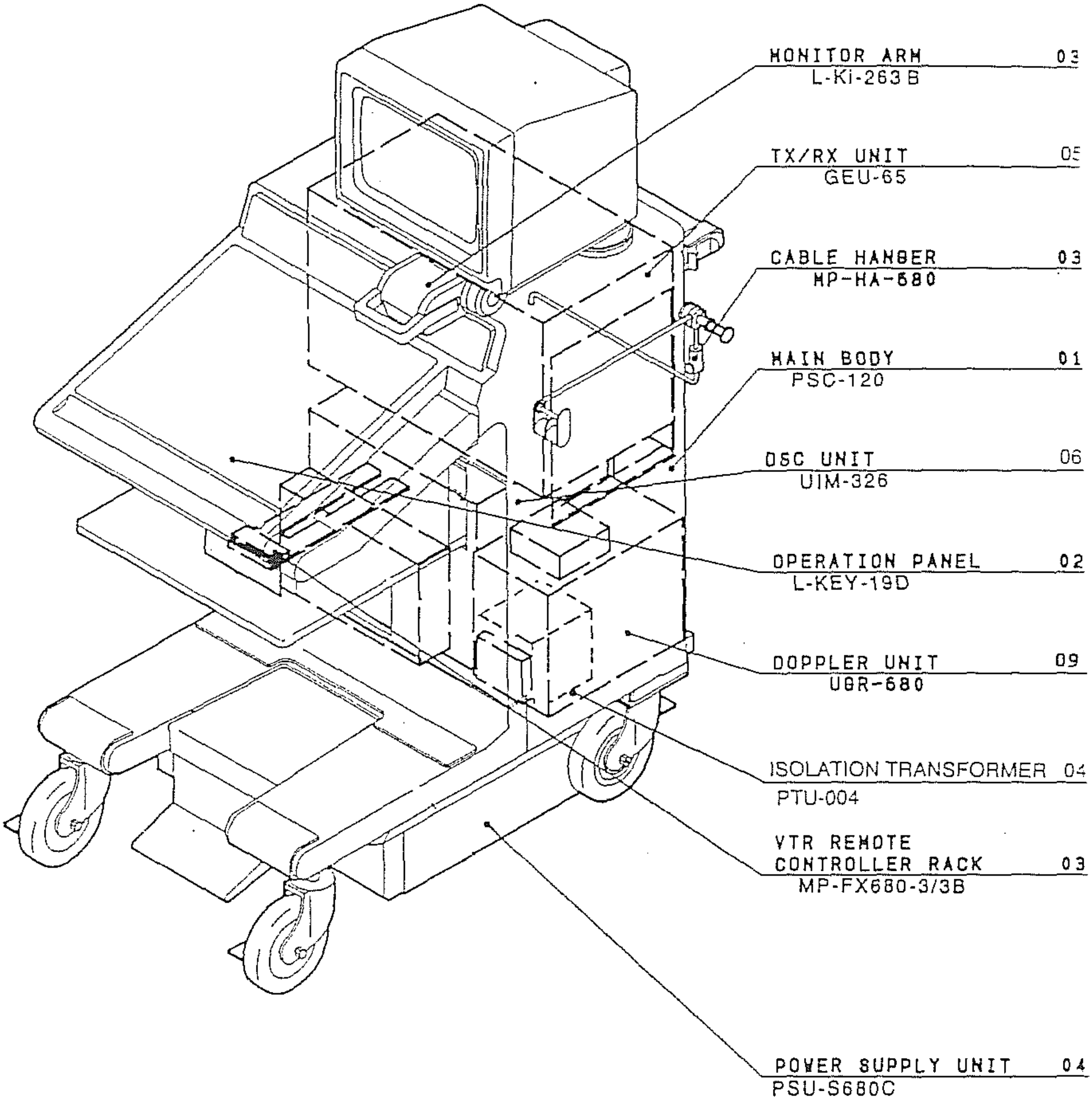
ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
	A311308	NK3※8	SCREW:NK3※8		
	A383203	PW3	WASHER:PW3		
	A383204	PW4	WASHER:PW4		
	A321310	S3※10	SCREW FLAT HEAD:S3※10		
	A322310	S3※10Bs	SCREW FLAT HEAD:S3※10Bs		
	A321312	S3※12	SCREW FLAT HEAD:S3※12		
	A322316	S3※16Bs	SCREW FLAT HEAD:S3※16Bs		
	A321325	S3※25	SCREW FLAT HEAD:S3※25		
	A321330	S3※30	SCREW FLAT HEAD:S3※30		
	A321306	S3※6	SCREW FLAT HEAD:S3※6		
	A322306	S3※6Bs	SCREW FLAT HEAD:S3※6Bs		
	A321308	S3※8	SCREW FLAT HEAD:S3※8		
	A322308	S3※8Bs	SCREW FLAT HEAD:S3※8Bs		
	A321410	S4※10	SCREW FLAT HEAD:S4※10		
	A321412	S4※12	SCREW FLAT HEAD:S4※12		
	A321415	S4※15	SCREW FLAT HEAD:S4※15		
	A321406	S4※6	SCREW FLAT HEAD:S4※6		
	A321408	S4※8	SCREW FLAT HEAD:S4※8		
	A383303	SW3	WASHER:SW3		
	A384003	SW3Bs	WASHER:SW3Bs		
	A383304	SW4	WASHER:SW4		
	A383305	SW5	WASHER:SW5		
	A383306	SW6	WASHER:SW6		

※ means ASSEMBLY PARTS.
アッセンブリーパーツ

09	SCREWS & SMALL PARTS	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
	A140091	TR-16-8-16	CABLECLAMP:INDEX 01		
	A140090	TRCC-23-11-14	CABLECLAMP:INDEX 01,03		
	A622000	UL-13	CABLECLAMP:INDEX 01,05		
	A622001	UL-23	CABLECLAMP:INDEX 01		
	A383112	W12	WASHER:W12		
	A383103	W3	WASHER:W3		
	A383105	W5	WASHER:W5		
	A381306	W6	WASHER:W6		

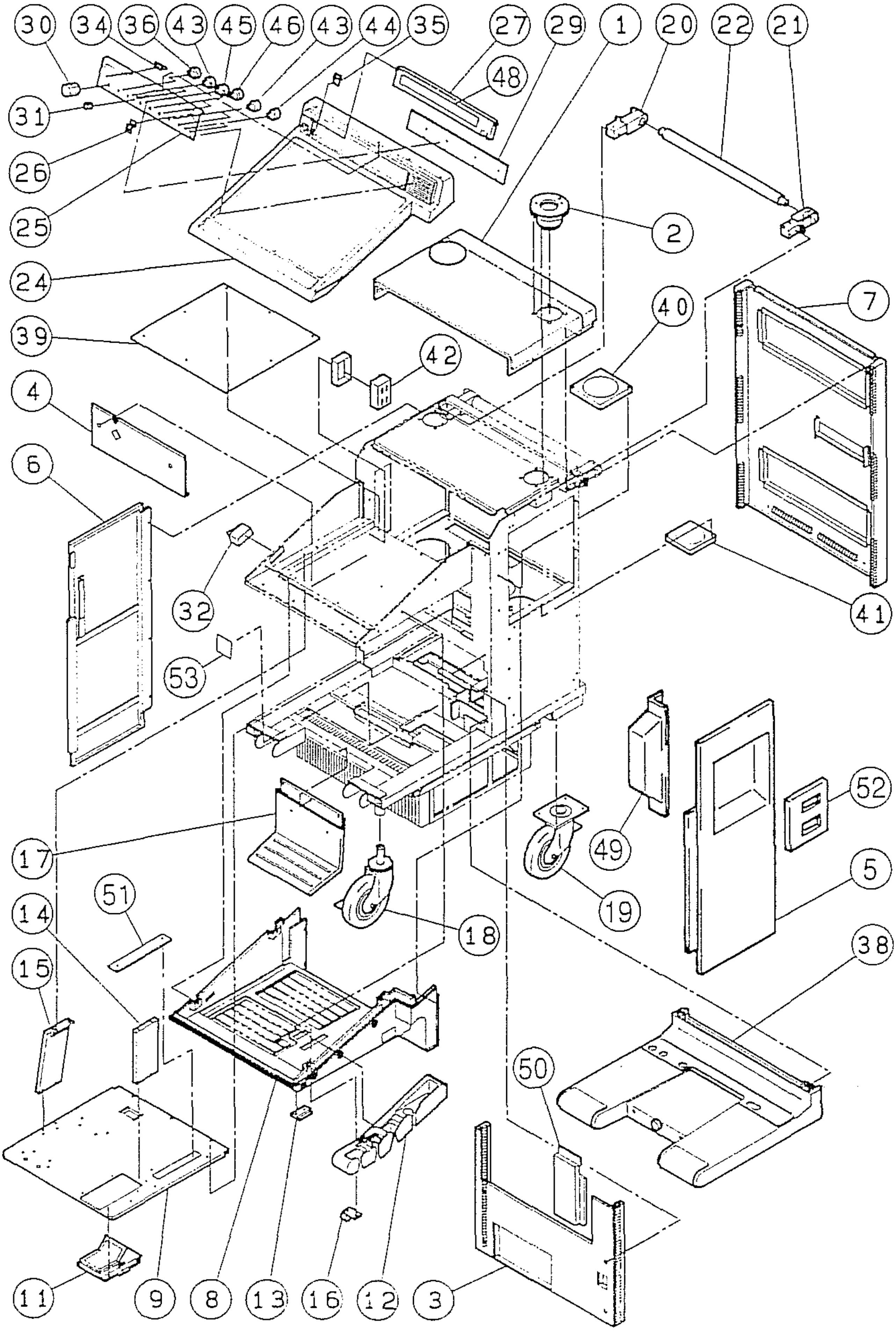
＊ means ASSEMBLY PARTS. .
アッセンブリーパーツ .


MONITOR ARM 03
L-Ki-263 B
TX/RX UNIT 05
GEU-65
CABLE HANGER 03
MP-HA-680
MAIN BODY 01
PSC-120
DSC UNIT 06
UIM-326
OPERATION PANEL 02
L-KEY-19D
DOPPLER UNIT 09
UGR-680
ISOLATION TRANSFORMER 04
PTU-004
VTR REMOTE
CONTROLLER RACK 03
MP-FX680-3/3B
POWER SUPPLY UNIT 04
PSU-S680C

CABLES SEE
INDEX 07

SCREWS & SMALL PARTS
SEE INDEX 08

01	MAIN BODY:	UNIT PSC-120	S/N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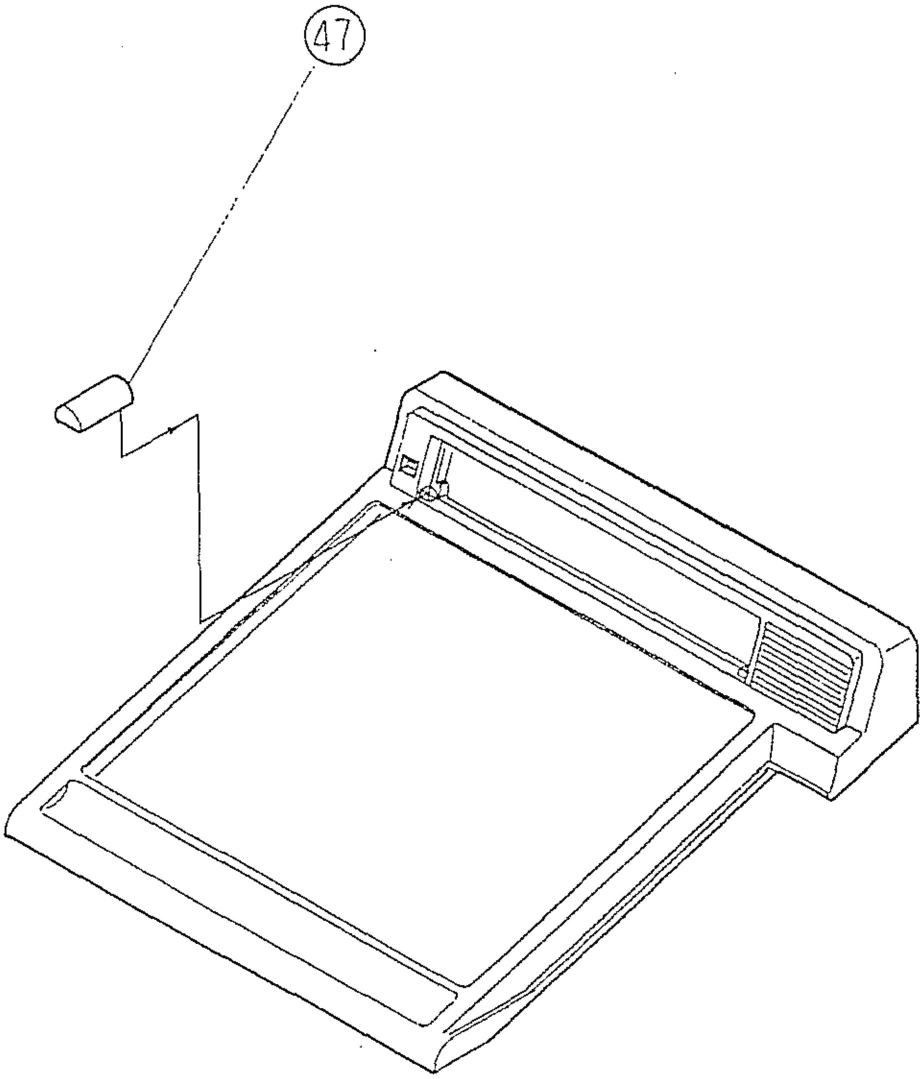
SSD-680STD 0101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01	MAIN BODY	UNIT PSC-120	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
1	※A200379	SAP-680-01-01	COVER:TOP		EXCEPT USA
1	※A200529	SAP-680-01-01 -A.A.	COVER:TOP		FOR USA(A.A)
1	※A200530	SAP-680-01-01 -CORO	COVER:TOP		FOR USA(CORO.)
2	※A200564	SAP-680STD-01-02	BASE:MONITOR ARM		
3	※A200531	SAP-680EX-01-03	COVER:FRONT		EXCEPT USA
3	※A200532	SAP-680EX-01-03 -A.A	COVER:FRONT		FOR USA(A.A)
3	※A200533	SAP-680EX-01-03 -CORO	COVER:FRONT		FOR USA(CORO.)
4	※A200384	SAP-680-01-04	COVER:INTERMEDIATE		
5	※A200534	SAP-680EX-01-05	COVER:RIGHT		
6	※A200535	SAP-680EX-01-06	COVER:LEFT		
7	※A200536	SAP-680EX-01-07	COVER:REAR		EXCEPT USA
7	※A200537	SAP-680EX-01-07 -A.A	COVER:REAR		FOR USA(A.A)
7	※A200538	SAP-680EX-01-07 -CORO	COVER:REAR		FOR USA(CORO.)
8	※A200539	SAP-680EX-01-08	COVER:PANEL, BOTTOM		
9	※A200540	SAP-680EX-01-09	DECK:INTERMEDIATE		
11	※A200392	SAP-680-01-11	JELL BOTTLE HOLDER		
12	A120003	PSC-108#18	PROBE HOOK		
13	A110008	PSC-108#33	RAIL:REMOTE CONTROL RACK		
14	A110009	PSC-108#52	INTERMEDIATE DECK ARM(1)		
15	※A200393	SAP-680-01-15	INTRTMEDIATE DECK ARM(2)		
16	A140018	B-1075	HINGE		
17	A120107	MP-FX680EX-1#1	FOOT REST		
18	A140011	SSC-150-CB	CASTER :FRONT		

※ means ASSEMBLY PARTS.
アッセンブリーパーツ

01	MAIN BODY	UNIT PSC-120	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
19	A150001	L-Ki-232	CASTER :REAR		
20	※A200541	SAP-680EX-01-20	HANDLE ARM :RIGHT		
21	※A200542	SAP-680EX-01-21	HANDLE ARM :LEFT		
22	A110002	PSC-108#28	HANDLE		
24	※A200554	SAP-680EX-01-24	COVER: PANEL	~	
25	※A200543	SAP-680EX-01-25	BLIND PANEL		
26	※A200399	SAP-680-01-26	SPRING:BLIND DOOR		
27	※A200553	SAP-680STD-01-27	BLIND DOOR		EXCEPT CORO.
29	A800738	EP-2512※	PCB:BLIND PANEL		
30	A510000	SP-4107u-1	KNOB		
31	A510013	SP-4108	KNOB		
32	A611063	L-S-59	SWITCH:POWER		
34	A800739	EP-2510※	PCB:PHONE JACK		
35	A800740	EP-3143※	PCB		
36	A623033	RV16YN20SC5kΩ	VOLUME:AUDIO VOLUME		
38	※A200545	SAP-680EX-01-38	COVER:BASE		
39	A800742	EP-3265※	PCB:MAIN CONTROL		
40	A625003	109S-086	FAN		
41	A625004	109S-096	FAN		
42	A601001	WK-3004	AC RECEPTACLE:J320, 321		
43	A623034	RV12YP20SB5kΩ	VOLUME:AGC(B, M), ECOH ERASE		
44	A611053	D-2012B	SWITCH:FTC, POS/NEG, INT/EXT		
45	A611064	L-S-52	SWITCH:SWEEP SPEED		

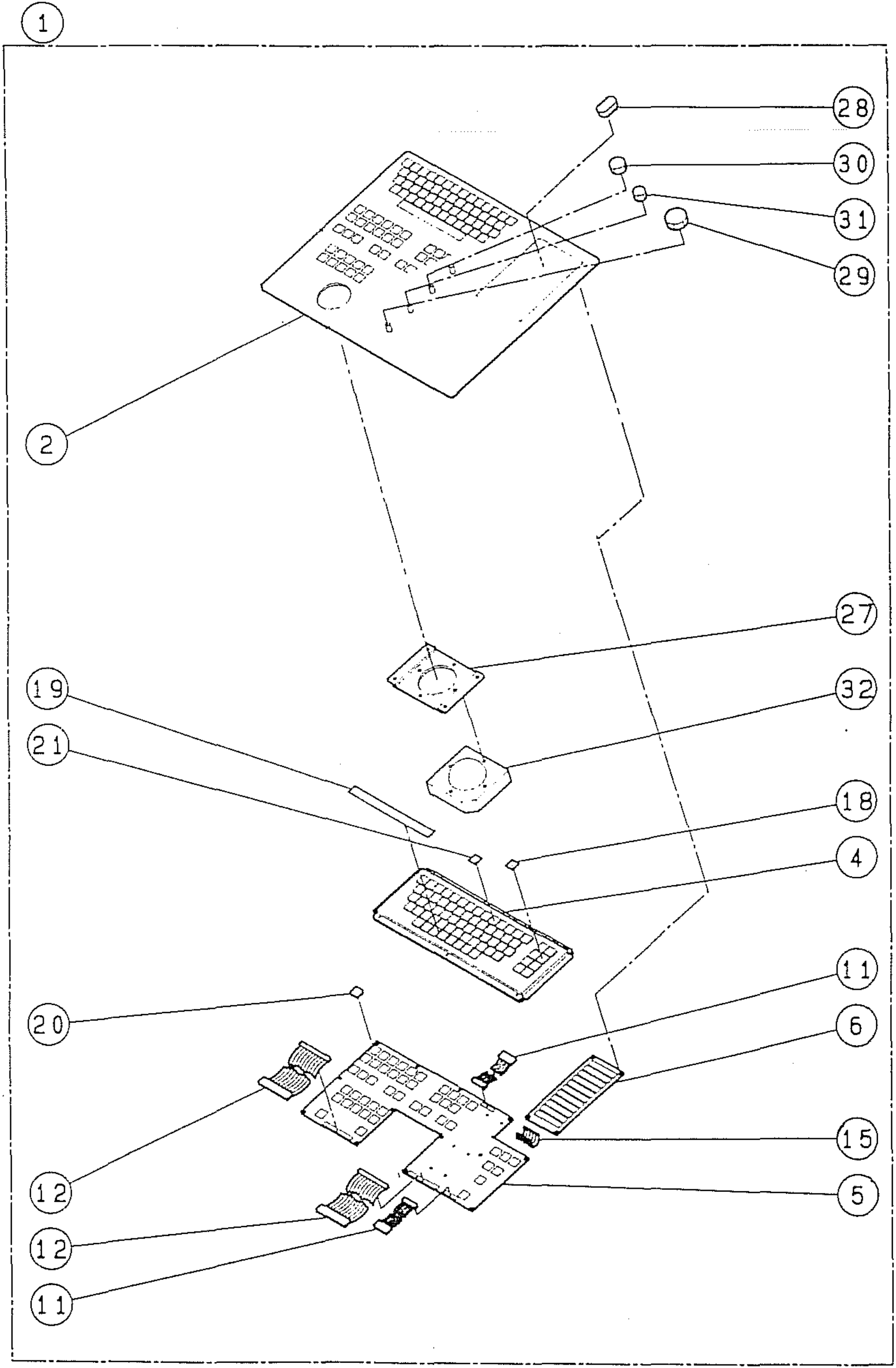
※ means ASSEMBLY PARTS.
アッセンブリーパーツ

01	MAIN BODY	UNIT PSC-120	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
46	A611065	L-S-53	SWITCH:CONTRAST(B,M)		
47	A120100	PSC-108#60	STOPPER		
48	A600096	P-32-680-CORO	NAME PLATE		FOR USA (CORO.
49	A110142	PSC-118#67	DUCT		
50	A110143	PSC-118#69	JB COVER		
51	A110144	SAP-680EX-01-51	COVER:INTERMEDIATE DECK		
52	A110145	PSC-118#32	COVER:COSMETIC, CONNECTOR	~21M08251	
53	A600110	PSC-120#73	LABEL		

※ means ASSEMBLY PARTS.
アッセンブリーパーツ

02	OPERATION PANEL	UNIT L-KEY-19D	S/N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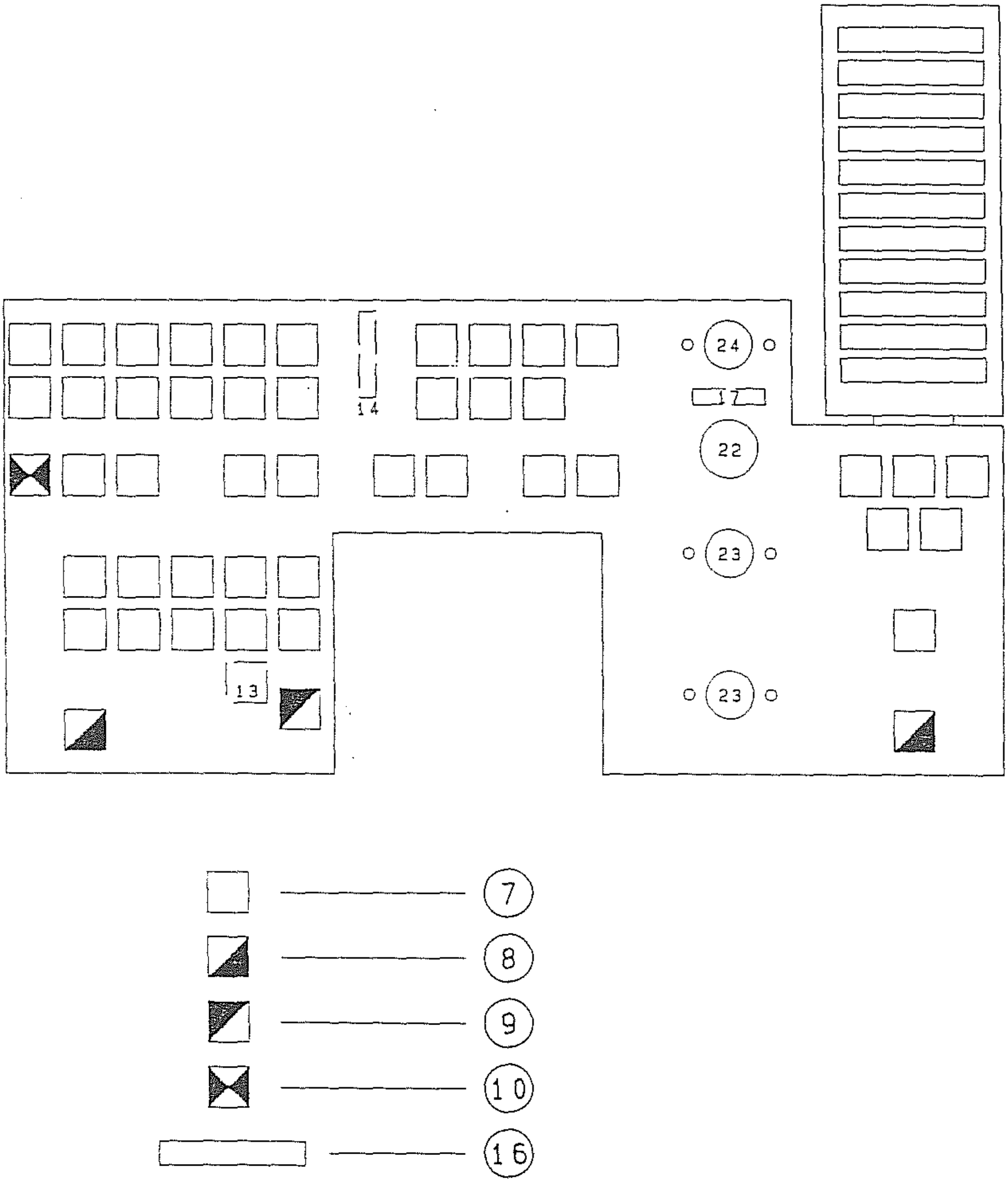
02	OPERATION PANEL	UNIT L-KEY-19D	S/N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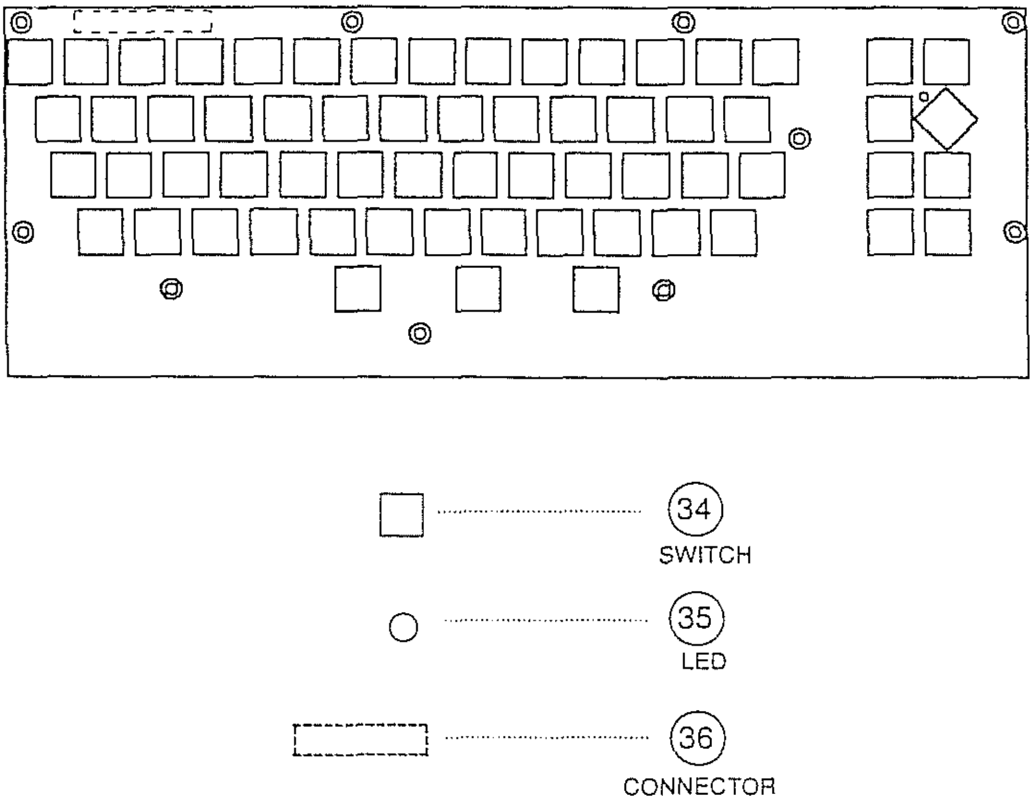
02	OPERATION PANEL	UNIT L-KEY-26	S / N


34
SWITCH
35
LED
36
CONNECTOR

02	OPERATION PANEL	UNIT L-KEY-19D/26	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
1	※A200555	L-KEY-19D	PANEL FULL ASSEMBLY		
2	※A200556	SAP-680EX-02-02	PANEL SHEET		
4	※A200162	L-KEY-26	FULL KEY BOARD ASSY		
5	A801015	EP-2960※	PCB:SW		
6	A801016	EP-3182※	PCB:RV		
7	A611002	A3FA-101-O	SWITCH(ORANGE)		
8	A611003	A3FA-401-Y	SWITCH(YELLOW)		
9	A611004	A3FA-401-O	SWITCH(ORANGE)		
10	A611005	A3FA-101-G	SWITCH(GREEN)		
11	※A200409	L-KEY-19#19	CABLE ASSY:J363, J362		
12	※A200410	L-KEY-19#18	CABLE ASSY:J360, J361		
13	A601003	5046-06A	CONNECTOR:J365		
14	A601002	5046-04A	CONNECTOR:J391		
15	※A200411	L-KEY-19C#20	JUMPER CABLE		
16	A623000	EVA-UBH-S15-B13	RV:STC		
17	A601006	3429-6002LCSC	CONNECTOR:J364		
18	※A200412	L-KEY-19C#26	KEY BUTTON:RED		
19	※A200413	L-KEY-19C#24	KEY BUTTON:SPACE		
20	※A200414	L-KEY-19C#16	KEY BUTTON:WHITE		
21	※A200415	L-KEY-19C#15	KEY BUTTON:CLEAR		
22	A611001	SRM-1-01-11	ROTARY SWITCH		
23	A623001	RV20YP1-23S-B1K	VARIABLE RESISTOR ROTARY		
24	A623002	RV20YP1-23S-B5K	VARIABLE RESISTOR ROTARY		

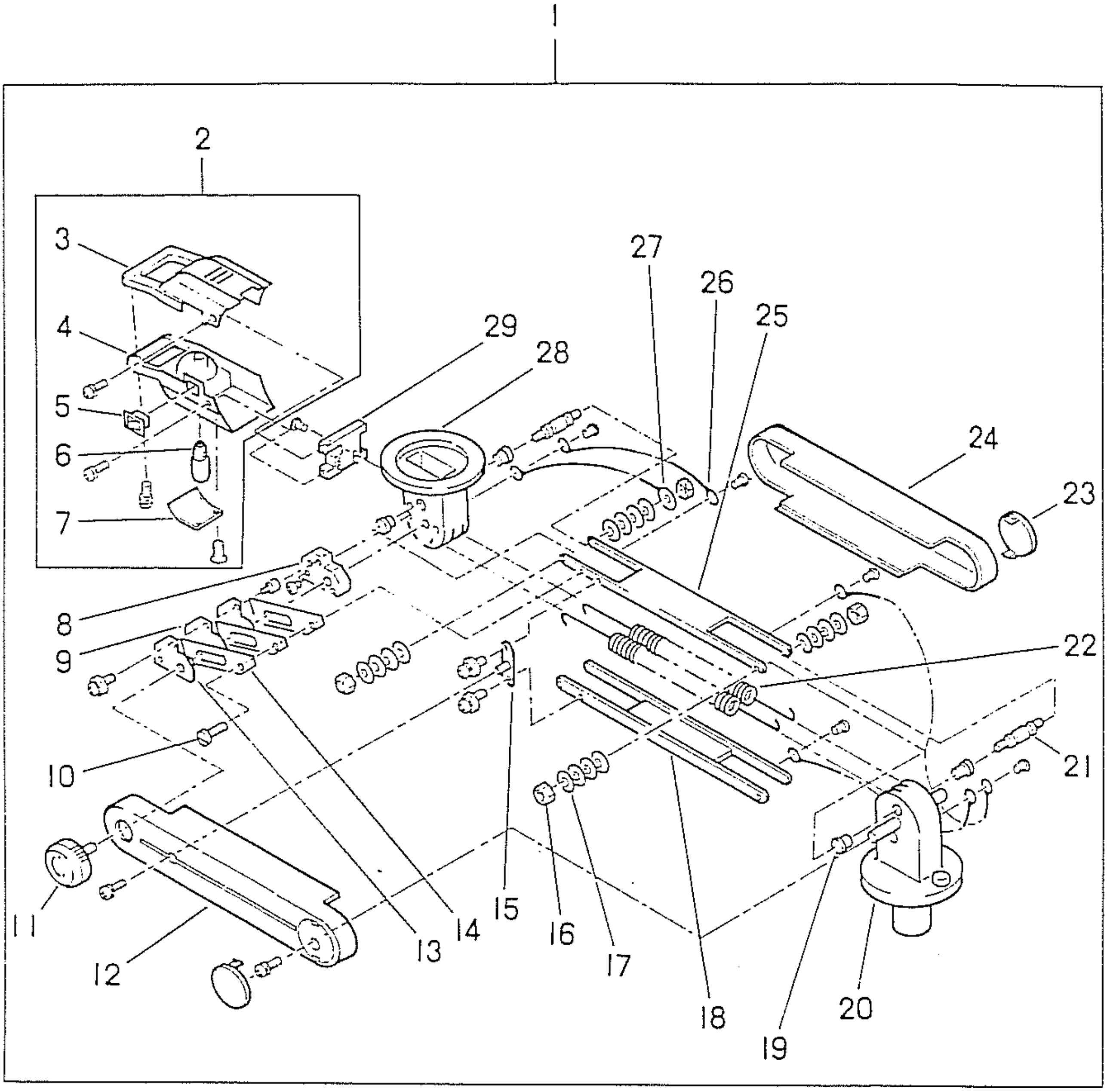
※ means ASSEMBLY PARTS. : アッセンブリーパーツ :

02	OPERATION PANEL	UNIT L-KEY-19D/26	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
27	A100186	PSC-105#25	TRACK BALL MOUNTING PLATE		
28	A510010	SP-4103UB	KNOB:STC		
29	A510002	SP-4104	KNOB		
30	A510011	SP-4106	KNOB		
31	A510012	SP-4107-1	KNOB		
32	A618000	L-TB-1B	TRACK BALL		
34	A611013	B3F-1050	KEY SWITCH(without KEY-TOP)		
35	A616014	EBR3432S	LED		
36	A601087	3428-6002LCSC	CONNECTOR		

※ means ASSEMBLY PARTS. .
アッセンブリーパーツ .

		UNIT	S / N
03	MONITOR ARM	L-Ki-263B	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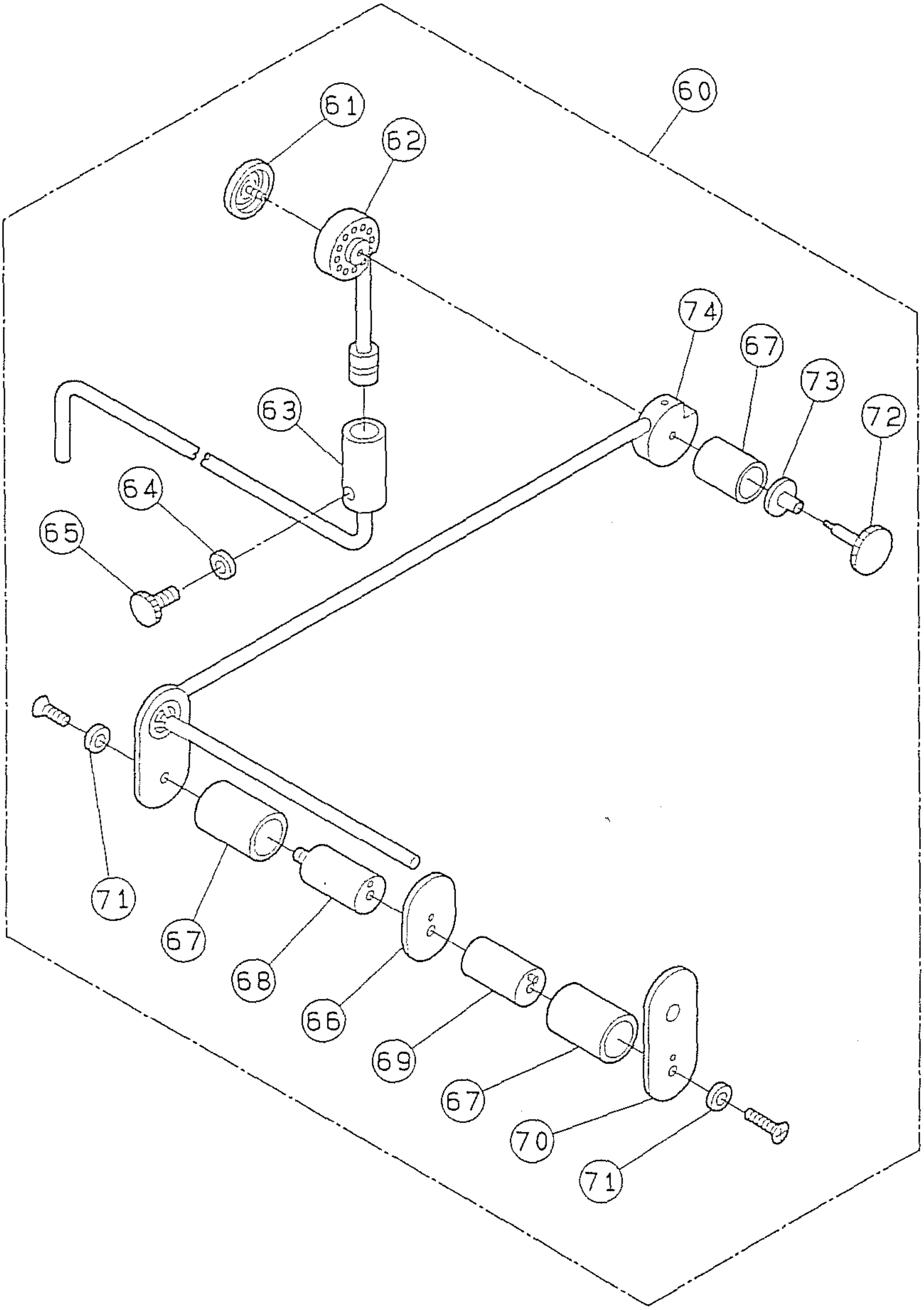
03	CABLE HANGER	UNIT MP-HA-680	S/N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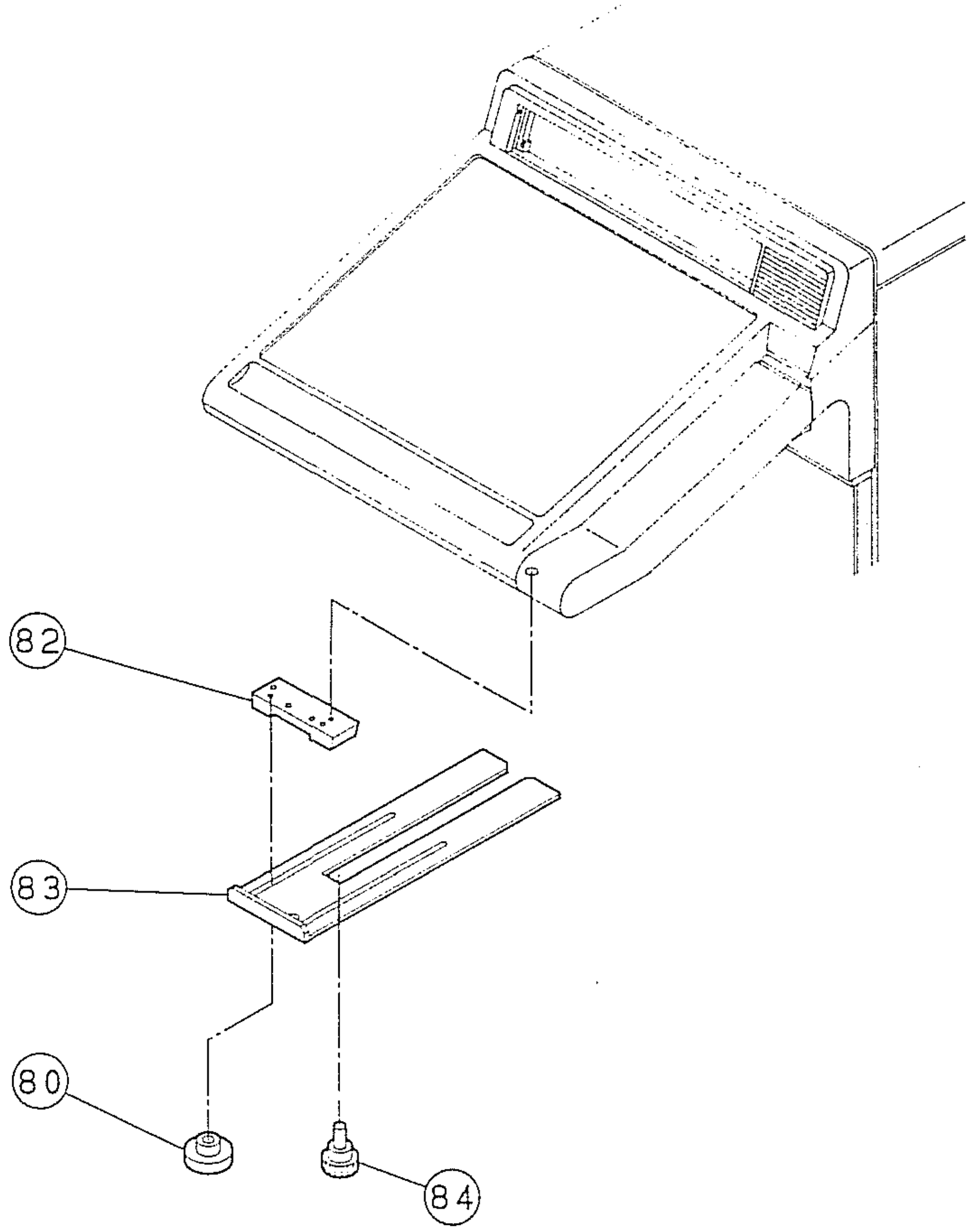
03	VTR REMOTE CONTROLLER RACK	UNIT MP-FX-680-3B	S/N



03	MACHINERY	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
1	A150071	L-Ki-263B	MONITOR ARM ASSY	~	
2	A150072	L-Ki-263LAMP	LAMP ASSY		
3	A150073	L-Ki-263#37	COVER : LAMP, UPPER		
4	A150074	L-Ki-263#38	COVER : LAMP, LOWER		
5	A150075	L-Ki-263#36	SWITCH		
6	A150076	L-Ki-263#35	LAMP		
7	A150077	L-Ki-263#51	SCREEN		
8	A150078	L-Ki-263#20	SPACER		
9	A150079	L-Ki-263#21	FRICTION PLATE		
10	A150080	L-Ki-263#25	FRICTION LINK MOUNITING BOLT		
11	A150081	L-Ki-263#49	KNOB		
12	A150082	L-Ki-263#39	COVER : RIGHT		
13	A150083	L-Ki-263#23	MOUNTING BRACE		
14	A150084	L-Ki-263#22	FRICTION LINK	~	
15	A150085	L-Ki-263#11	COVER MOUNTING POST	~	
16	A150086	L-Ki-263#15	NUT	~	
17	A150087	L-Ki-263#14	WASHER	~	
18	A150088	L-Ki-263#17	LINK(B)	~	
19	A150089	L-Ki-263#16	BUSHING	~	
20	A150090	L-Ki-263#5	BASE	~	
21	A150091	L-Ki-263#10	PIN	~	
22	A150093	L-Ki-263B#1	EXTENSION SPRING	~	
23	A150094	L-Ki-263#41	CAP	~	

※ means ASSEMBLY PARTS.
アッセンブリーパーツ

03	MACHINERY	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
24	A150095	L-Ki-263#40	COVER:LEFT	~	
25	A150096	L-Ki-263#9	LINK(A)	~	
26	A150097	L-Ki-263#46	GROUNDING WIRE (A)	~	
27	A150098	L-Ki-263#47	GROUNDING WIRE (B)	~	
28	A150099	L-Ki-263#2	MOUNTING BRACE	~	
29	A150100	L-Ki-263#29	LAMP COVER MOUNTING BRACE	~	
60	A800256	MP-HA680	CABLE HANGER FULL ASSY		
61	A120005	MP-HA600#2-4	CAP		
62	※A200130	SAP-600-4-11	JOINT ROD (2)		
63	※A200417	SAP-680-03-63	JOINT ROD (1)		
64	A110021	MP-HA600#1-6	CUSHION		
65	A110020	MP-HA600#1-5	LOCK KNOB		
66	A110029	MP-HA600#3-9	PARTITION PLATE		
67	A110024	MP-HA600#3-2	ROLLER(1)		
68	A110027	MP-HA600#3-7	SHAFT(1)		
69	※A200235	SAP-600-4-3	SHAFT(2)		
70	A110022	MP-HA600#3-10	MOUNTING BRACE		
71	A110023	MP-HA600#3-11	SURFACE WASHER		
72	A110026	MP-HA600#3-4	LOCK KNOB		
73	A110025	MP-HA600#3-3	ROLLER(2)		
74	※A200418	SAP-680-03-74	JOINT ASSY(C)		
80	A110013	MP-FX680-3#1	SPACER		
82	A110014	MP-FX680-3#2	MOUNTING BLOCK		

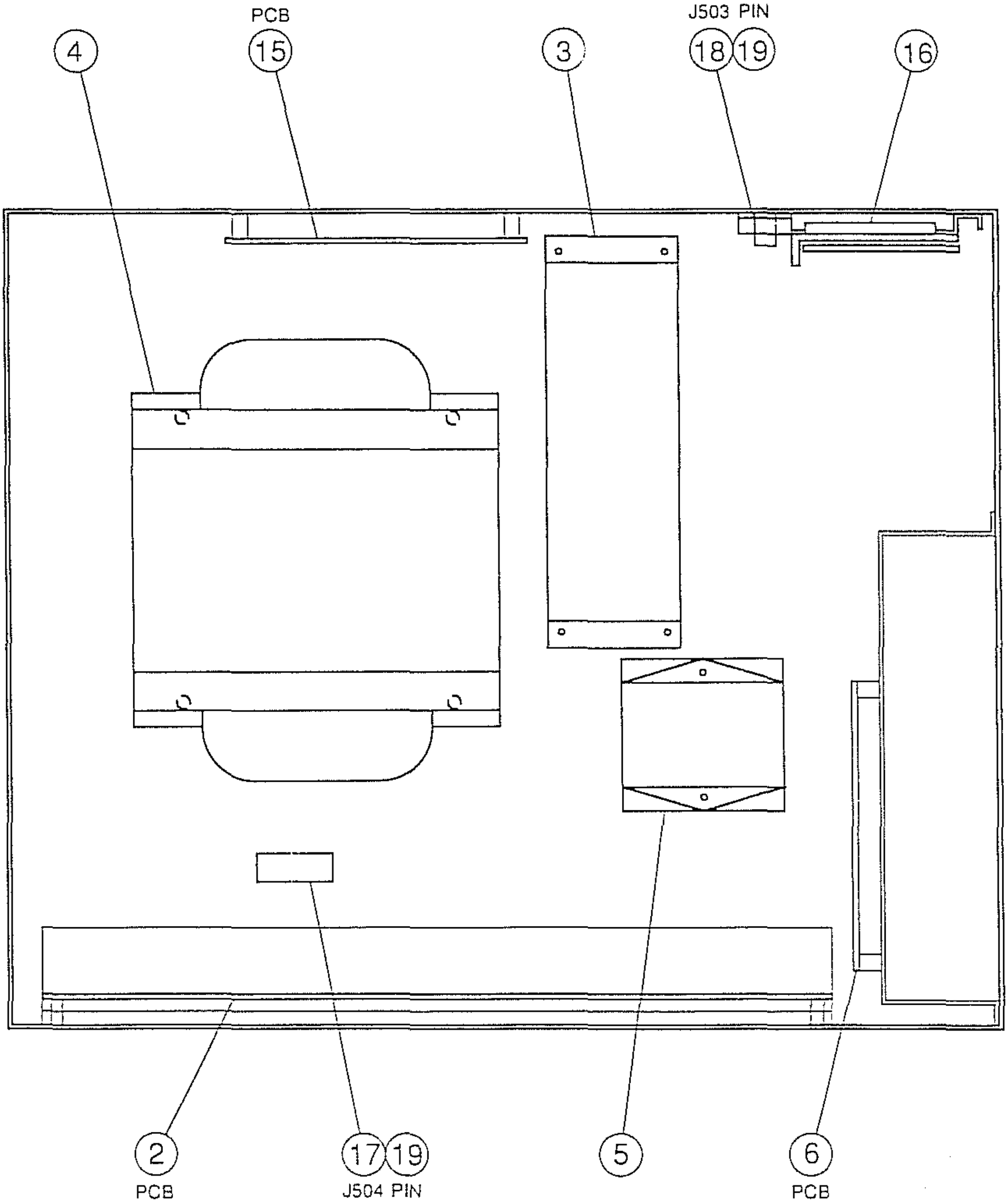
※ means ASSEMBLY PARTS. :
アッセンブリーパーツ :

03	MACHINERY	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
83	※A200551	SAP-680EX-03-83B	SLIDE PLATE		MP-FX680-3B
84	A140023	KS15※10A	KNOB		

※ means ASSEMBLY PARTS. .
アッセンブリーパーツ :

① UNIT ASSY


PCB
⑮
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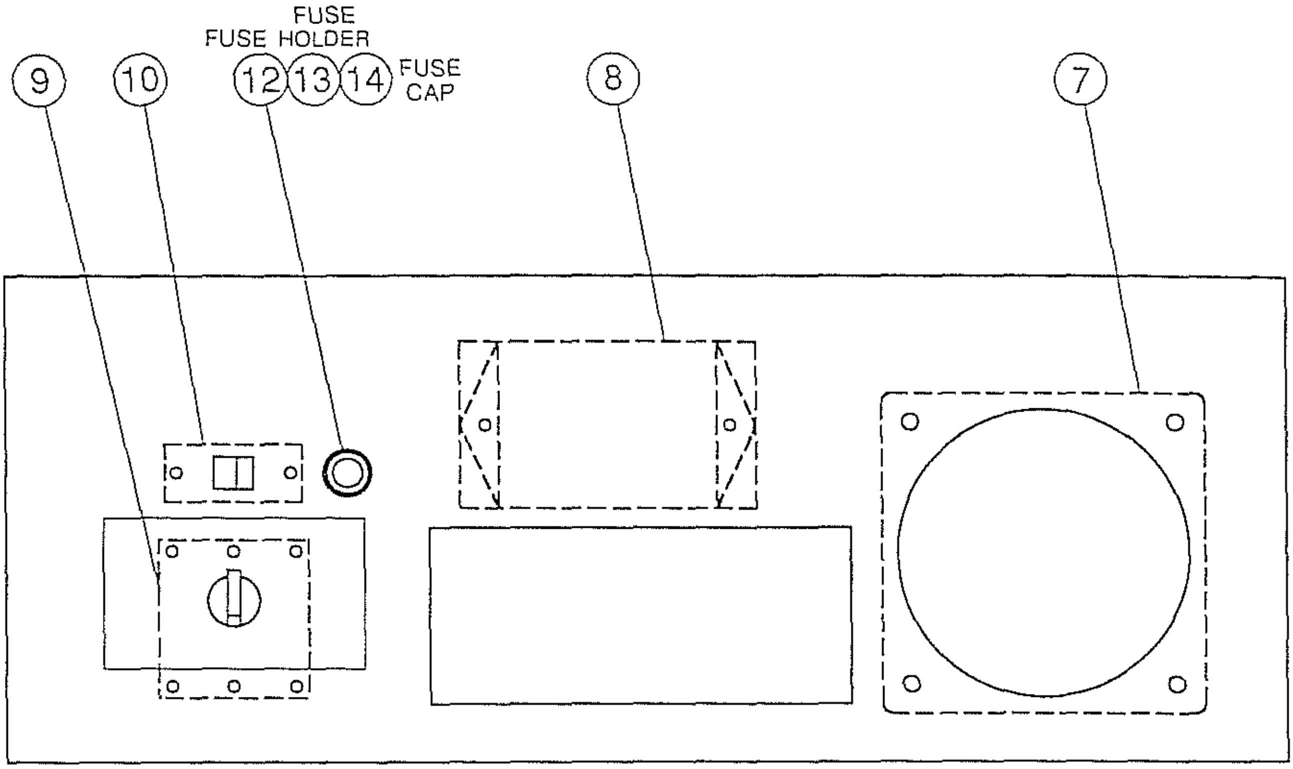
③
J503 PIN
⑱⑲
⑯
②
PCB
⑰⑲
J504 PIN
⑤
⑥
PCB

04	POWER SUPPLY UNIT	UNIT PSU-S680C	S / N

LEFT SIDE VIEW


FUSE
FUSE HOLDER
FUSE CAP
9
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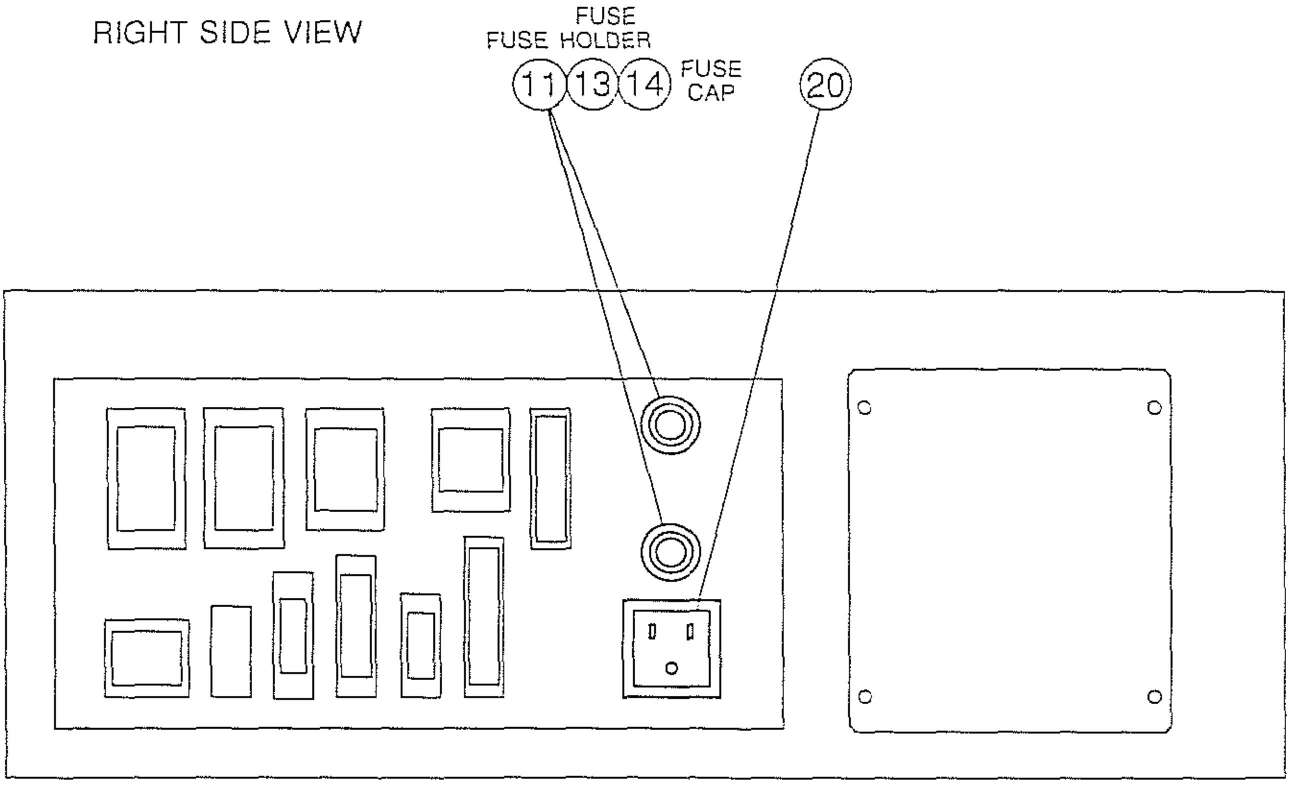
RIGHT SIDE VIEW


FUSE
FUSE HOLDER
FUSE CAP
11
13
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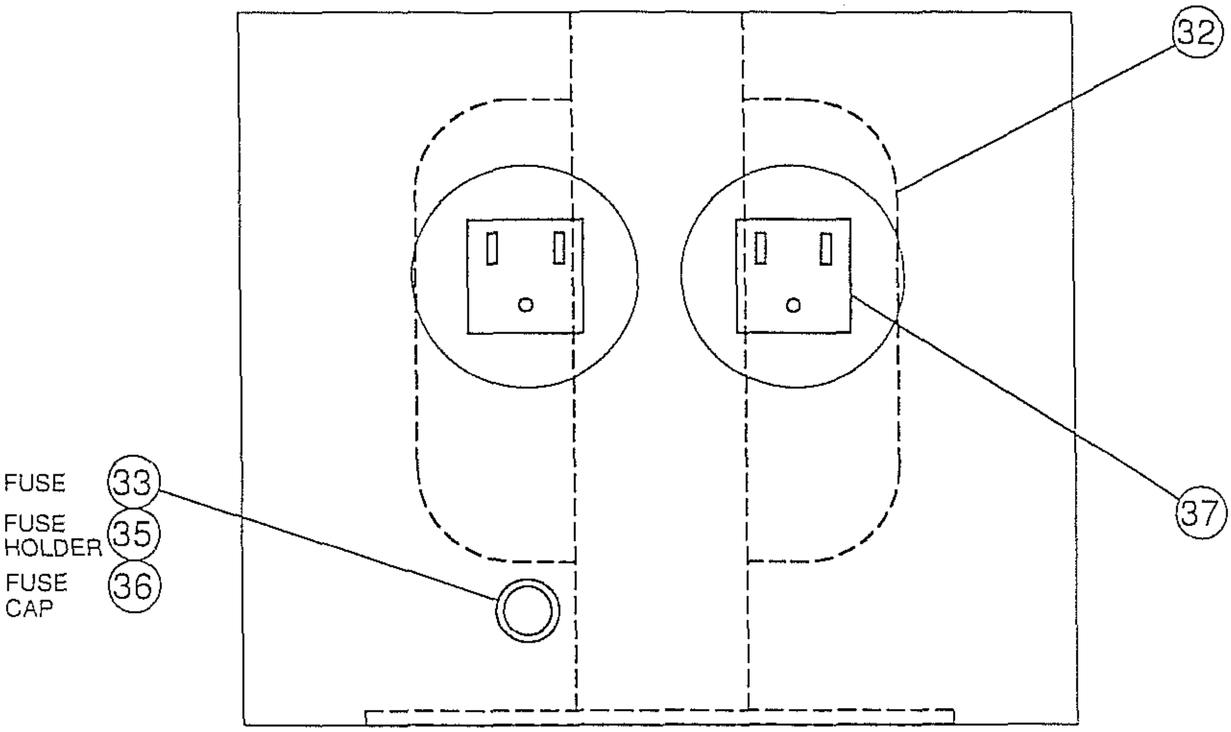
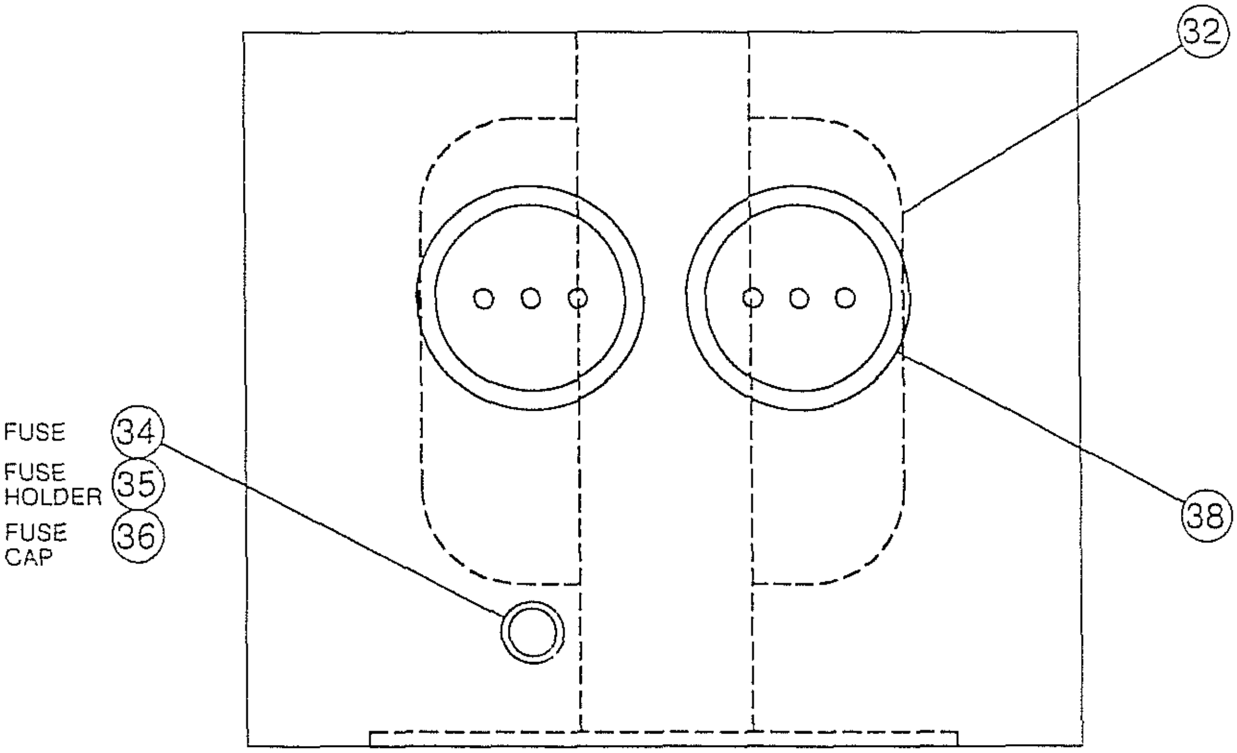
20

㉚ UNIT ASSY (100V)


32
37
FUSE 33
FUSE HOLDER 35
FUSE CAP 36

㉛ UNIT ASSY (200V)


32
38
FUSE 34
FUSE HOLDER 35
FUSE CAP 36

04	POWER SUPPLY UNIT	UNIT PSU-S680C	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
1	A000012	PSU-S680C	UNIT ASSY		
2	A800745	EP-3240B	PCB	~	
3	A030019	HK12-5/A	SWITCHING POWER SUPPLY	~	
4	A606028	M-T-231	ISOLATION TRANSFORMER	~	
5	A606016	MBW-1205-22	LINE FILTER	~	
6	A800989	EP-3535※	PCB	~	
7	A625021	109P0924M406	FAN	~	
8	A606017	MAS-1220-33	LINE FILTER	~	
9	A621035	UB2-XLN-111-108E-15, 108E-15,108-6	BREAKER	~	
10	A611062	SU110A-11	VOLTAGE SELECTOR	~	
11	A621049	313 002	FUSE:F2, F501	~	
12	A621050	313 001	FUSE:F502	~	
13	A621022	FEU031-1673	FUSE HOLDER	~	
14	A621023	FEK031-1661	FUSE CAP	~	
15	A801017	EP-2922※	PCB	~	
16	A030020	SSG010-15	SWITCHING POWER SUPPLY	~	
17	A601019	1-480703-0	CONNECTOR:J504	~	
18	A601015	1-480764-0	CONNECTOR:J503	~	
19	A601077	350547-1	PIN CONTACT	~	
20	A601016	AC-G10BB44	AC OUTLET	~	
30	A030001	PTU-004	ISOLATION TRANSFORMER ASSY		FOR 100V
31	A030001	PTU-004	ISOLATION TRANSFORMER ASSY		FOR 200V
32	A606034	M-T-133B	ISOLATION TRANSFORMER		

※ means ASSEMBLY PARTS. :
アッセンブリーパーツ :

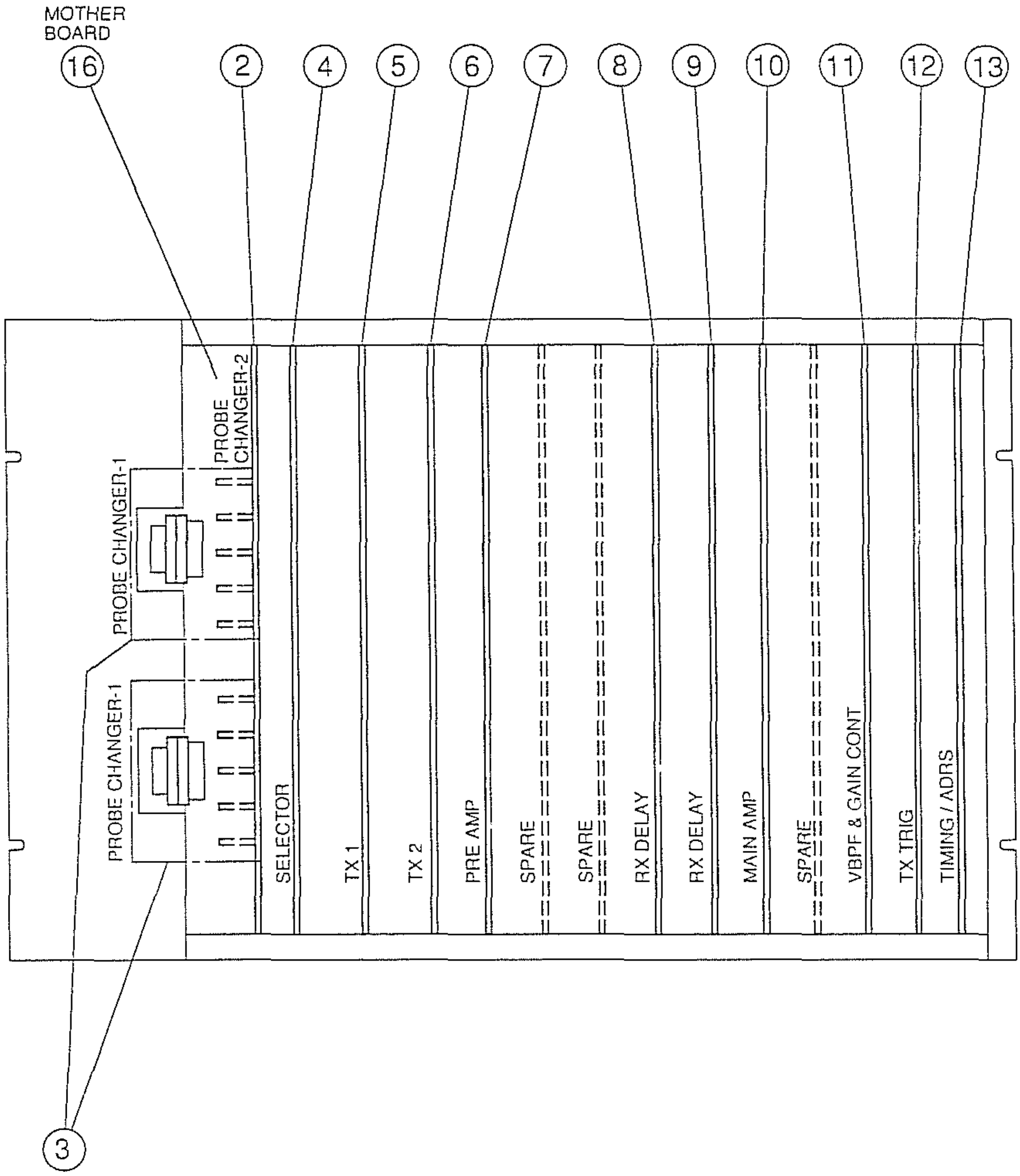
04	POWER SUPPLY UNIT	UNIT PSU-S680C	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
33	A621047	326. 01 0	FUSE		FOR 100V
34	A621048	313. 005	FUSE		FOR 200V
35	A621022	FEU031-1673	FUSE HOLDER		
36	A621023	FEK031-1661	FUSE CAP		
37	A601016	AC-G10BB44	AC OUTLET		FOR 100V
38	A601058	418037	AC OUTLET		FOR 200V

※ means ASSEMBLY PARTS. .
アッセンブリーパーツ .

05	PCB UNIT	UNIT GEU-65	S / N

① UNIT ASSY


MOTHER BOARD
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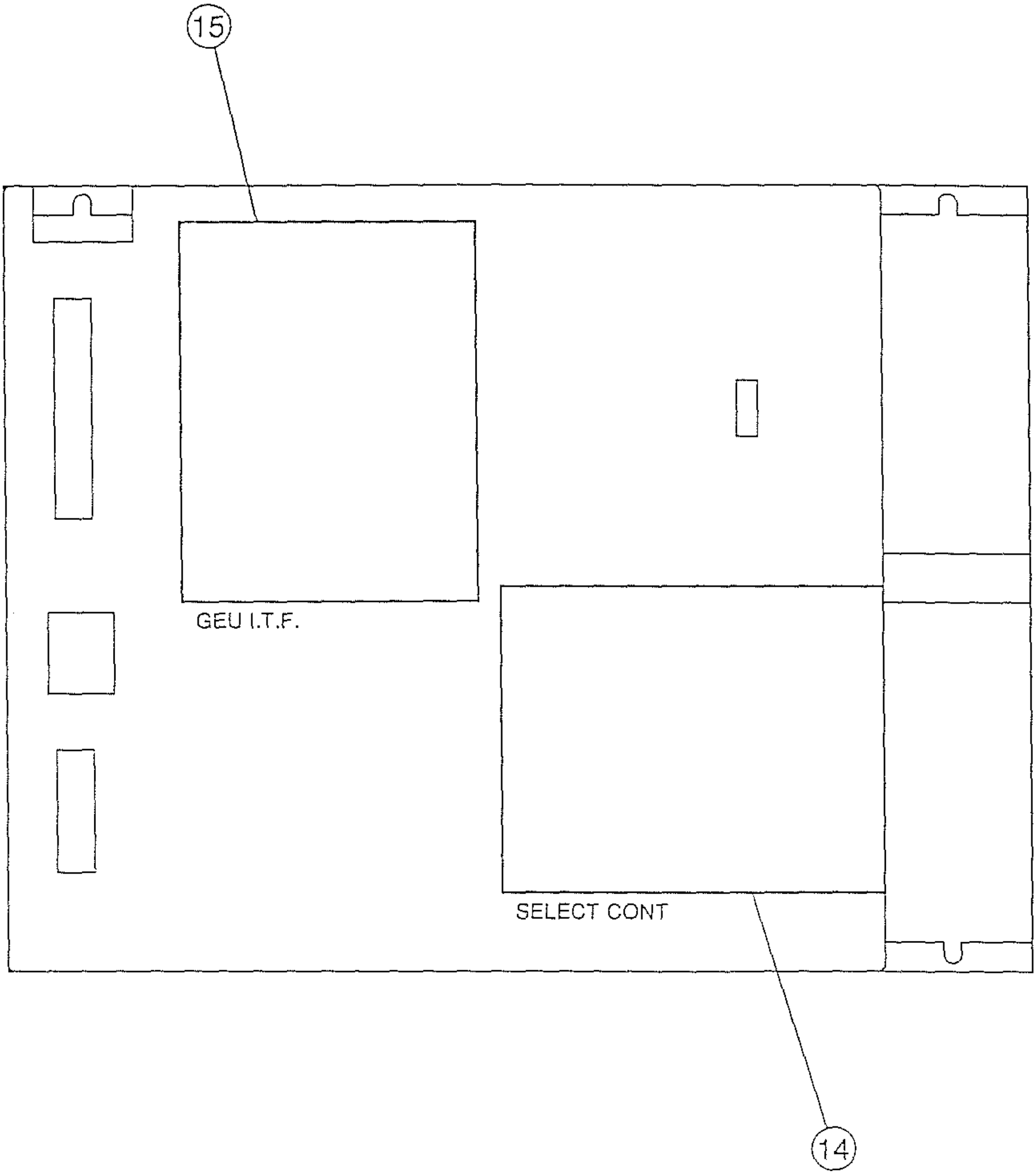
②
④
⑤
⑥
⑦
⑧
⑨
⑩
⑪
⑫
⑬
PROBE CHANGER-2
PROBE CHANGER-1
PROBE CHANGER-1
SELECTOR
TX 1
TX 2
PRE AMP
SPARE
SPARE
RX DELAY
RX DELAY
MAIN AMP
SPARE
VBPF & GAIN CONT
TX TRIG
TIMING / ADRS
③

MOTHER BOARD SIDE


15
GEU I.T.F.
SELECT CONT
14

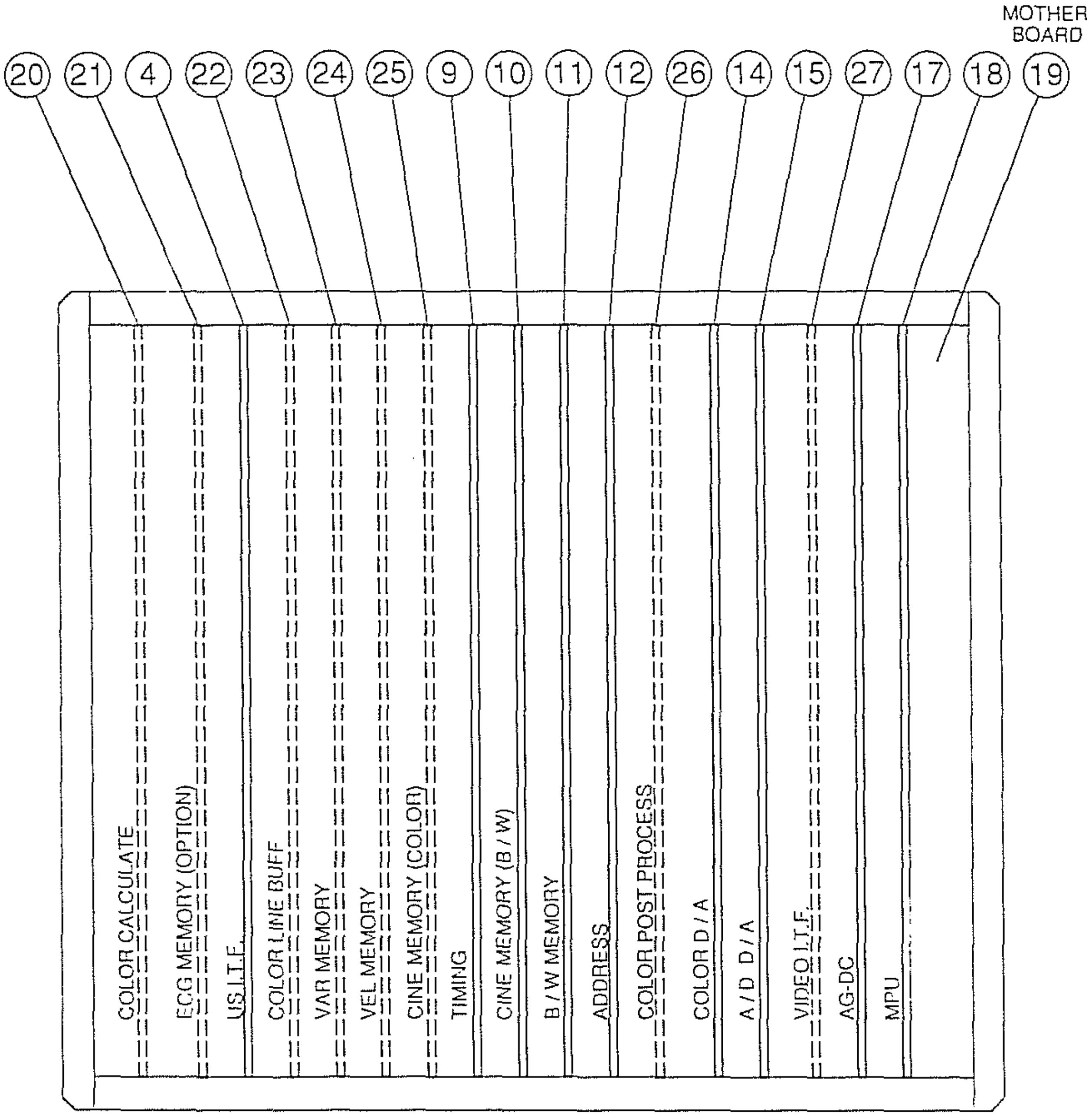
05	PCB	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
1	A000014	GEU-65	UNIT ASSY		
2	A800950	EP-3454	PCB:PROBE CHANGER-2		
3	A800951	EP-3453Σ	PCB:PROBE CHANGER-1		
4	A800952	EP-3455	PCB:SELECTOR		
5	A800953	EP-3456	PCB:TX 1		
6	A800954	EP-3457	PCB:TX 2		
7	A800955	EP-3458	PCB:PRE AMP		
8	A800956	EP-3459	PCB:RX DELAY		
9	A800956	EP-3459	PCB:RX DELAY		
10	A800980	EP-3461-2	PCB:MAIN AMP		
11	A800958	EP-3463	PCB:GAIN CONT		
12	A800959	EP-3464	PCB:TX TRIG		
13	A800960	EP-3465	PCB:TIMING/ADRS		
14	A800961	EP-3452	PCB:SELECT CONT		
15	A800962	EP-3525	PCB:GEU I.T.F.		
16	A800963	EP-3466	PCB:MOTHER BOARD		

※ means ASSEMBLY PARTS.
アッセンブリーパーツ

06	PCB UNIT	UNIT UIM-326	S / N

① UNIT ASSY


MOTHER BOARD
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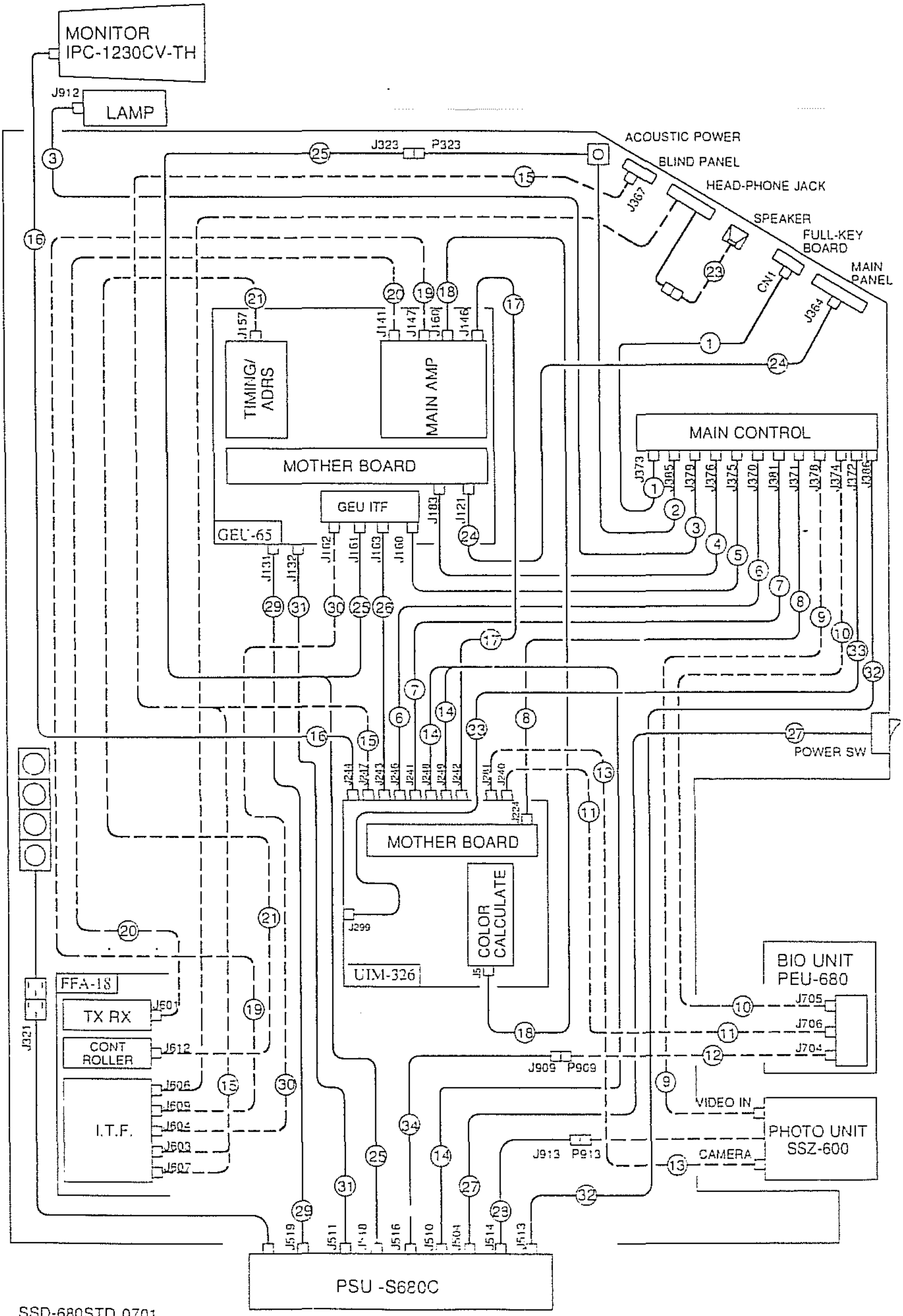
⑲
COLOR CALCULATE
ECG MEMORY (OPTION)
US I.T.F.
COLOR LINE BUFF
VAR MEMORY
VEL MEMORY
CINE MEMORY (COLOR)
TIMING
CINE MEMORY (B / W)
B / W MEMORY
ADDRESS
COLOR POST PROCESS
COLOR D / A
A / D D / A
VIDEO I.T.F.
AG-DC
MPU

06	PCB	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
1	A000015	UIM-326	UNIT ASSY		
4	A800966	EP-3477	PCB:US I.T.F		
9	A800969	EP-3620	PCB:TIMING		
10	A800970	EP-3237	PCB:CINE MEMO(B/W)		
11	A800971	EP-3247	PCB:B/W MEMORY		
12	A800972	EP-3236	PCB:ADDRESS		
14	A800981	EP-2651-3	PCB:COLOR D/A		
15	A800982	EP-2729-7	PCB:A/D D/A		
17	A800929	EP-2629	PCB:AG-DC		
18	A800983	EP-2913	PCB:MPU		
19	A800974	EP-3467	PCB:MOTHER BOARD		
20	A800965	EP-5100	PCB:COLOR CALCULATE		FOR CFM-680
21	A800975	EP-2841	PCB:ECG MEMORY		FOR PEU-680B(O
22	A800150	EP-3115	PCB:COLOR LINE BUFF		FOR CFM-680
23	A800967	EP-2213-1	PCB:VAR MEMORY		FOR CFM-680
24	A800149	EP-2213	PCB:VEL MEMORY		FOR CFM-680
25	A800968	EP-3238	PCB:CINE MEMO(COLOR)		FOR CFM-680
26	A800152	EP-3114	PCB:COLOR POST PROCES		FOR CFM-680
27	A800984	EP-3443-1	PCB:VIDEO I.T.F.		FOR CFM-680(PA
27	A800985	EP-3443-2	PCB:VIDEO I.T.F.		FOR CFM-680(NT

※ means ASSEMBLY PARTS. .
アッセンブリーパーツ .

07	CABLE	UNIT PSC-120	S / N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IPC-1230CV-TH
J912
LAMP
ACOUSTIC POWER
BLIND PANEL
HEAD-PHONE JACK
SPEAKER
FULL-KEY BOARD
MAIN PANEL
J323
P323
J367
CN1
J364
TIMING/ ADRS
MAIN AMP
J157
J141
J147
J160
J146
MOTHER BOARD
GEU ITF
GEU-65
J131
J132
J162
J161
J163
J160
J183
J121
MAIN CONTROL
J373
J385
J379
J376
J375
J370
J381
J371
J378
J374
J372
J386
POWER SW
J244
J247
J243
J246
J241
J248
J249
J242
J241
J240
J224
MOTHER BOARD
COLOR CALCULATE
J299
UIM-326
J5
BIO UNIT
PEU-680
J705
J706
J704
J909
P909
VIDEO IN
PHOTO UNIT
SSZ-600
J913
P913
CAMERA
FFA-18
TX RX
J601
CONT ROLLER
J612
J606
J609
J604
J603
J607
I.T.F.
J321
J519
J511
J516
J510
J504
J514
J513
PSU -S680C
①
②
③
④
⑤
⑥
⑦
⑧
⑨
⑩
⑪
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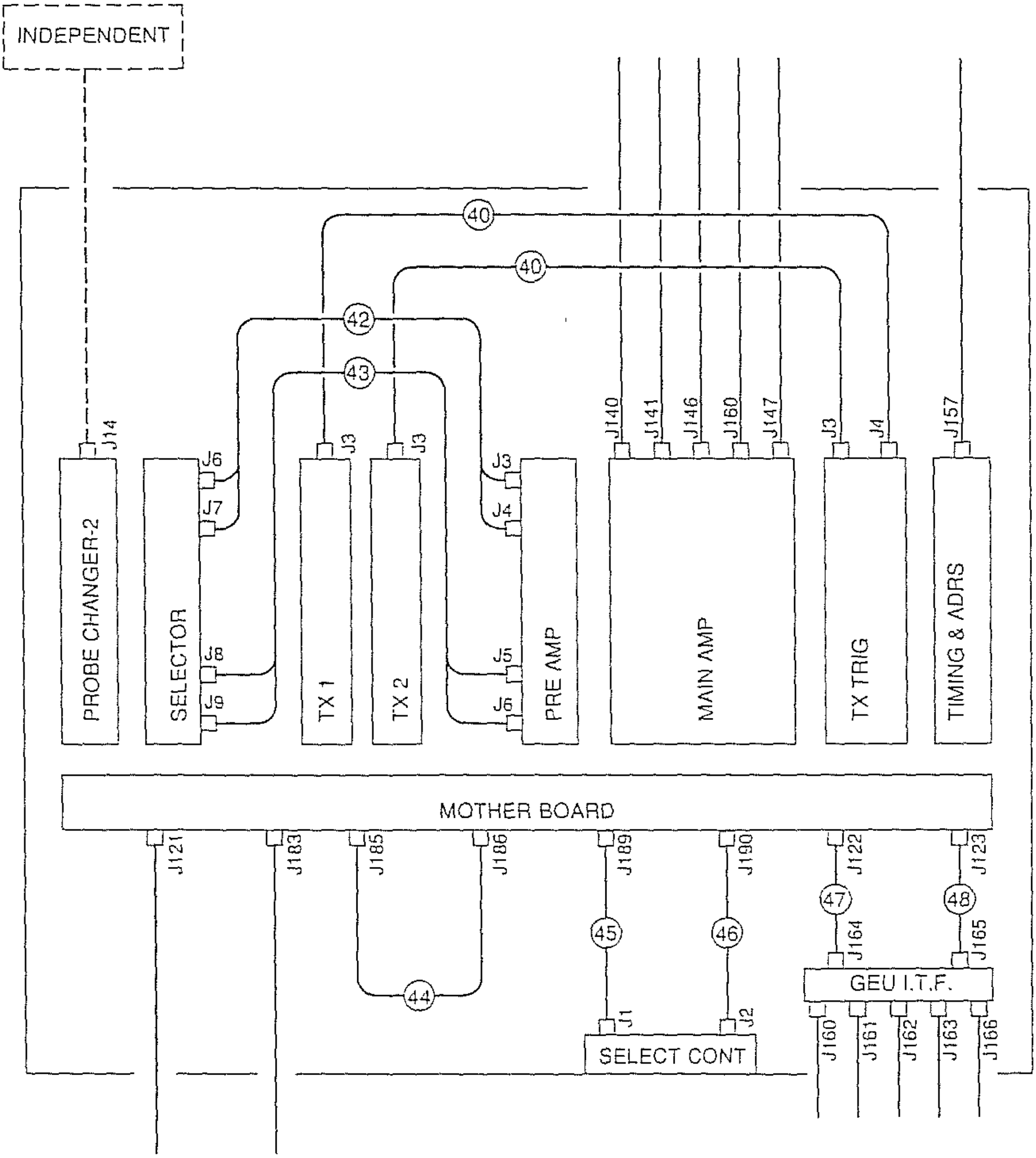
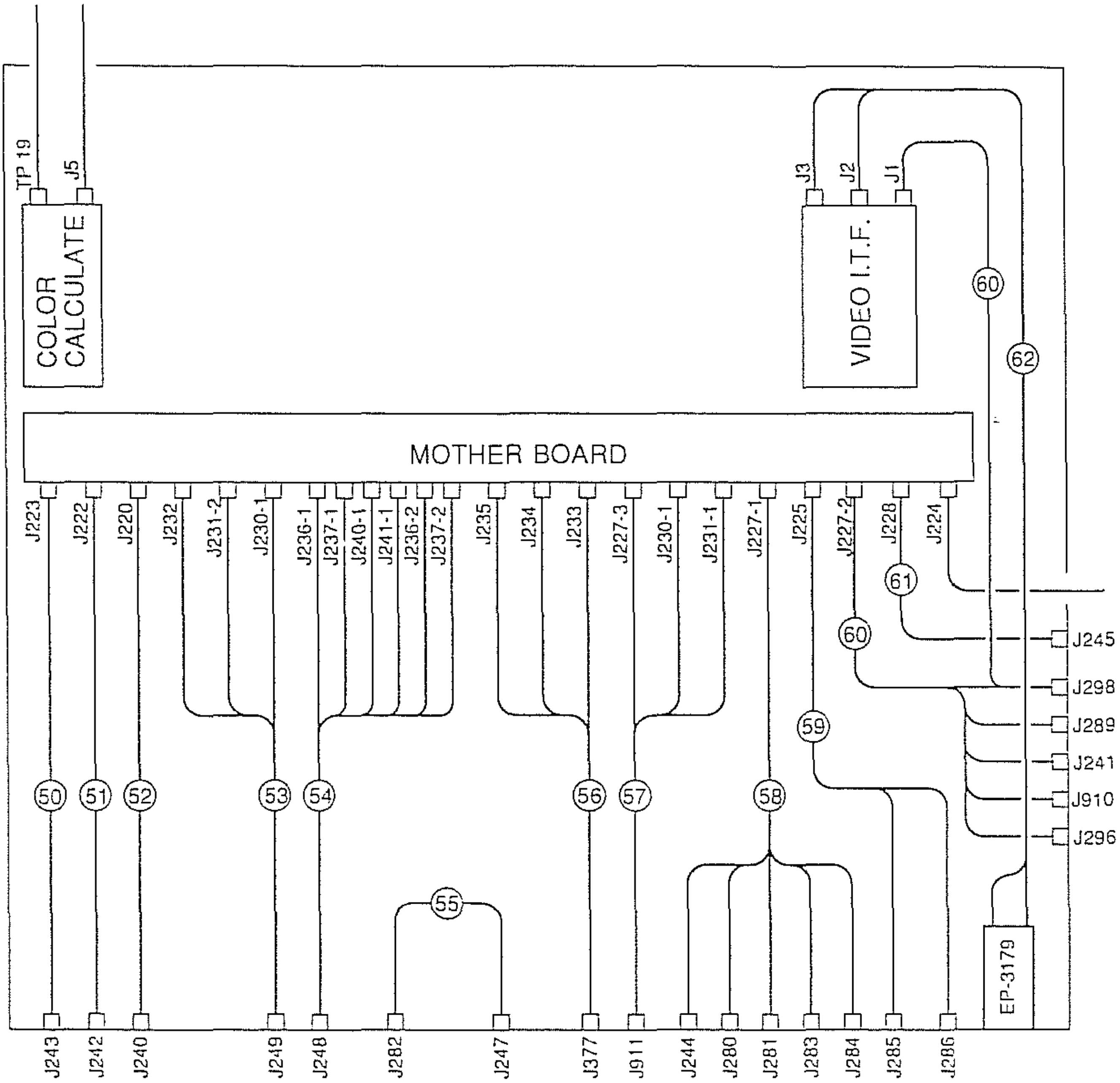
TX / RX UNIT : GEU-65


INDEPENDENT
PROBE CHANGER-2
J14
SELECTOR
J6
J7
J8
J9
TX 1
J3
TX 2
J3
PRE AMP
J3
J4
J5
J6
MAIN AMP
J140
J141
J146
J160
J147
TX TRIG
J3
J4
TIMING & ADRS
J157
40
40
42
43
MOTHER BOARD
J121
J183
J185
J186
J189
J190
J122
J123
44
45
46
47
48
J1
J2
SELECT CONT
J164
J165
GEU I.T.F.
J160
J161
J162
J163
J166

DSC UNIT : UIM-326


TP 19
J5
COLOR CALCULATE
J3
J2
J1
VIDEO I.T.F.
60
62
MOTHER BOARD
J223
J222
J220
J232
J231-2
J230-1
J236-1
J237-1
J240-1
J241-1
J236-2
J237-2
J235
J234
J233
J227-3
J230-1
J231-1
J227-1
J225
J227-2
J228
J224
61
60
59
J245
J298
J289
J241
J910
J296
50
51
52
53
54
55
56
57
58
EP-3179
J243
J242
J240
J249
J248
J282
J247
J377
J911
J244
J280
J281
J283
J284
J285
J286

07	CABLE	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
1	A800213	CO-PSC108-L-06	CABLE:J373-CN1	~	
2	A800991	CO-PSC-108-D-09	CABLE:J385-J323, ACOUSTIC POWER	~	
3	A800992	CO-PSC118-A 12	CABLE:J379-J912, LAMP	~	
4	A800993	CO-GEU64-J05	CABLE:J183-J376	~	
5	A800994	CO-GEU64-G04	CABLE:J375-J160	~	
6	A800216	CO-PSC108-P-08	CABLE:J370-J246	~	
7	A800215	CO-PSC108-F-08	CABLE:J381-J241	~	
8	A800995	CO-PSC108-J-08B	CABLE:J371-J224	~	
9	A800218	CO-PSC108-E-15	CABLE:J378-P700, CAMERA	~	
10	A800996	CO-PSC-108-K-04	CABLE:J705-J374	~	
11	A800997	CO-PSC-108-M-08	CABLE:J706-J240	~	
12	A800225	CO-PEU680-A-02	CABLE:J704-P909	~	
13	A800227	CO-PSC108-Q-05	CABLE:J281-J703, VIDEO IN	~	
14	A800998	CO-L-PS-40-F-07	CABLE:J510-J248, J249	~	
15	A800223	CO-PSC108-S-18	CABLE:J603-J367, 247-J607	~	
16	※A200560	L-CABLE301-16	CABLE:J244-P1000, MONITOR	~	
17	A800999	CO-GEU64-S-10	CABLE:J242-J146	~	
18	A801000	CO-GEU64-F05	CABLE:J5-J160	~	
19	A800799	CO-GEU50-K-10	CABLE:J147-J609	~	
20	A800798	CO-GEU50-J-08	CABLE:J601-J141	~	
21	A800234	CO-GEU50-N-10	CABLE:J612-J157	~	
23	A801001	CO-PSC108-H08	CABLE:J342-SPEAKER	~	
24	A801002	CO-GEU50-W-08	CABLE:J364-J121	~	

※ means ASSEMBLY PARTS.
アッセンブリーパーツ

07	CABLE	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
25	A800797	CO-PSC-108-A-13	CABLE:J518-J161, J323	~	
26	A801018	CO-GEU-50Y-04	CABLE:J163-J243		
27	A801003	CO-LPS-40-E-14	CABLE:J504-S300, SW	~	
28	A800228	CO-LPS40-H-10	CABLE:J913-J514	~	
29	A801004	CO-LPS-40-G-12	CABLE:J519-J131	~	
30	※A200561	L-CABLE-177-11	CABLE:J604-J162	~	
31	A801005	CO-LPS-40-B-13	CABLE:J511-J132		
32	A800217	CO-LPS40-A-12	CABLE:J386-J513	~	
33	※A200552	L-CABLE-341	CABLE:J299-J372		
34	A800226	CO-LPS40-D-12	CABLE:J909-J516	~	
40	※A200562	L-CABLE-392	CABLE:J3-J4, J3-J3	~	
42	A801006	CO-GEU64-A05	CABLE:J6, J7-J3, J4	~	
43	A801007	CO-GEU64-B05	CABLE:J8, J9-J5, J6	~	
44	A801008	CO-GEU64-M01	CABLE:J185-J186	~	
45	A801009	CO-GEU64-Q02	CABLE:J1-J189	~	
46	A801010	CO-GEU64-R02	CABLE:J2-J190	~	
47	A801011	CO-GEU64-K04	CABLE:J122-J164	~	
48	A801012	CO-GEU64-L04	CABLE:J123-J165	~	
50	A800804	CO-UIM324-D-05	CABLE:J223-J243	~	
51	A800803	CO-UIM324-C-04	CABLE:J222-J242	~	
52	A800801	CO-UIM324-A-04	CABLE:J220-J240	~	
53	A800810	CO-UIM324-J-04	CABLE:J249-J230-2, J231-2, J232	~	
54	A800809	CO-UIM324-I-04	CABLE:J248-J236,J237-2,J236-1,J237-1,J240-1,J241-1	~	

※ means ASSEMBLY PARTS.
アッセンブリーパーツ

07	CABLE	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
55	A800812	CO-UIM324-M-03B	CABLE:J247-J282	~	
56	A801013	CO-UIM325-A-04	CABLE:J377-J233, J234, J235	~	
57	A800246	CO-UIM324-O-08	CABLE:J911, J231-1, J230-1, J227-3	~	
58	A801014	CO-UIM324-L-06C	CABLE:J227-1-J280,J281, J283,J284,J244	~	
59	A800805	CO-UIM324-E-04	CABLE:J225-J286, J285	~	
60	A800815	CO-UIM324-N-04B	CABLE:J241-J910,J289,J -298,J1,J277-2,J296	~	
61	※A200563	L-CABLE-175	CABLE:J228-J245	~	
62	A800816	CO-UIM324-P-05	CABLE:J3, J2-EP-3179	~	

※ means ASSEMBLY PARTS. .
アッセンブリーパーツ .

08	SCREWS & SMALL PARTS	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
	A341254	3T2.5※4	SCREW HEXAGONAL:3T2.5※4		
	A341304	3T3※4	SCREW HEXAGONAL:3T3※4		
	A341408	3T4※8	SCREW HEXAGONAL:3T4※8		
	A301306	ANK3※6	SCREW:ANK3※6		
	A301308	ANK3※8	SCREW:ANK3※8		
	A301418	ANK4※18	SCREW:ANK4※18		
	A140092	ARC-68-A-14	CABLECLAMP:INDEX 03		
	A342616	B6※16	BOLT HEXAGONAL:B6※16		
	A342620	B6※20	BOLT HEXAGONAL:B6※20		
	A342820	B8※20	BOLT HEXAGONAL:B8※20		
	A316306	BK3※6	SCREW:BK3※6		
	A303310	BNK3※10	SCREW:BNK3※10		
	A304316	BNK3※16Bs	SCREW:BNK3※16Bs		
	A303320	BNK3※20	SCREW:BNK3※20		
	A303330	BNK3※30	SCREW:BNK3※30		
	A303306	BNK3※6	SCREW:BNK3※6		
	A304306	BNK3※6Bs	SCREW:BNK3※6Bs		
	A303308	BNK3※8	SCREW:BNK3※8		
	A304308	BNK3※8Bs	SCREW:BNK3※8Bs		
	A303412	BNK4※12	SCREW:BNK4※12		
	A304408	BNK4※8Bs	SCREW:BNK4※8Bs		
	A140089	CKN-07	CABLECLAMP:INDEX 01		
	A306306	CNK3※6	SCREW:CNK3※6		

※ means ASSEMBLY PARTS.
アッセンブリーパーツ

08	SCREWS & SMALL PARTS	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
	A306308	CNK3※8	SCREW:CNK3※8		
	A305308	CNK3※8Bs	SCREW:CNK3※8Bs		
	A306410	CNK4※10	SCREW:CNK4※10		
	A306425	CNK4※25	SCREW:CNK4※25		
	A306408	CNK4※8	SCREW:CNK4※8		
	A140093	CV-100	CABLECLAMP:INDEX 05		
	A140094	CV-200	CABLECLAMP:INDEX 05, 06		
	A622007	FCN3010	CABLECLAMP:INDEX 05		
	A347406	HB4※6	SCREW:HB4※6		
	A347516	HB5※16	SCREW:HB5※16		
	A140095	KD-3N	CABLECLAMP:INDEX 04		
	A140065	KD-6N	CABLECLAMP:INDEX 05, 04		
	A381103	N3	NUT HEXAGONAL:N3		
	A381703	N3Bs	NUT HEXAGONAL:N3Bs		
	A381104	N4	NUT HEXAGONAL:N4		
	A381106	N6	NUT HEXAGONAL:N6		
	A311310	NK3※10	SCREW:NK3※10		
	A312310	NK3※10Bs	SCREW:NK3※10Bs		
	A311312	NK3※12	SCREW:NK3※12		
	A312312	NK3※12Bs	SCREW:NK3※12Bs		
	A311316	NK3※16	SCREW:NK3※16		
	A311325	NK3※25	SCREW:NK3※25		
	A311305	NK3※5	SCREW:NK3※5		

※ means ASSEMBLY PARTS. :
アッセンブリーパーツ :

08	SCREWS & SMALL PARTS	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
	A311308	NK3※8	SCREW:NK3※8		
	A383203	PW3	WASHER:PW3		
	A383204	PW4	WASHER:PW4		
	A321310	S3※10	SCREW FLAT HEAD:S3※10		
	A322310	S3※10Bs	SCREW FLAT HEAD:S3※10Bs		
	A321312	S3※12	SCREW FLAT HEAD:S3※12		
	A322316	S3※16Bs	SCREW FLAT HEAD:S3※16Bs		
	A321325	S3※25	SCREW FLAT HEAD:S3※25		
	A321330	S3※30	SCREW FLAT HEAD:S3※30		
	A321306	S3※6	SCREW FLAT HEAD:S3※6		
	A322306	S3※6Bs	SCREW FLAT HEAD:S3※6Bs		
	A321308	S3※8	SCREW FLAT HEAD:S3※8		
	A322308	S3※8Bs	SCREW FLAT HEAD:S3※8Bs		
	A321410	S4※10	SCREW FLAT HEAD:S4※10		
	A321412	S4※12	SCREW FLAT HEAD:S4※12		
	A321415	S4※15	SCREW FLAT HEAD:S4※15		
	A321406	S4※6	SCREW FLAT HEAD:S4※6		
	A321408	S4※8	SCREW FLAT HEAD:S4※8		
	A383303	SW3	WASHER:SW3		
	A384003	SW3Bs	WASHER:SW3Bs		
	A383304	SW4	WASHER:SW4		
	A383305	SW5	WASHER:SW5		
	A383306	SW6	WASHER:SW6		

※ means ASSEMBLY PARTS.
アッセンブリーパーツ

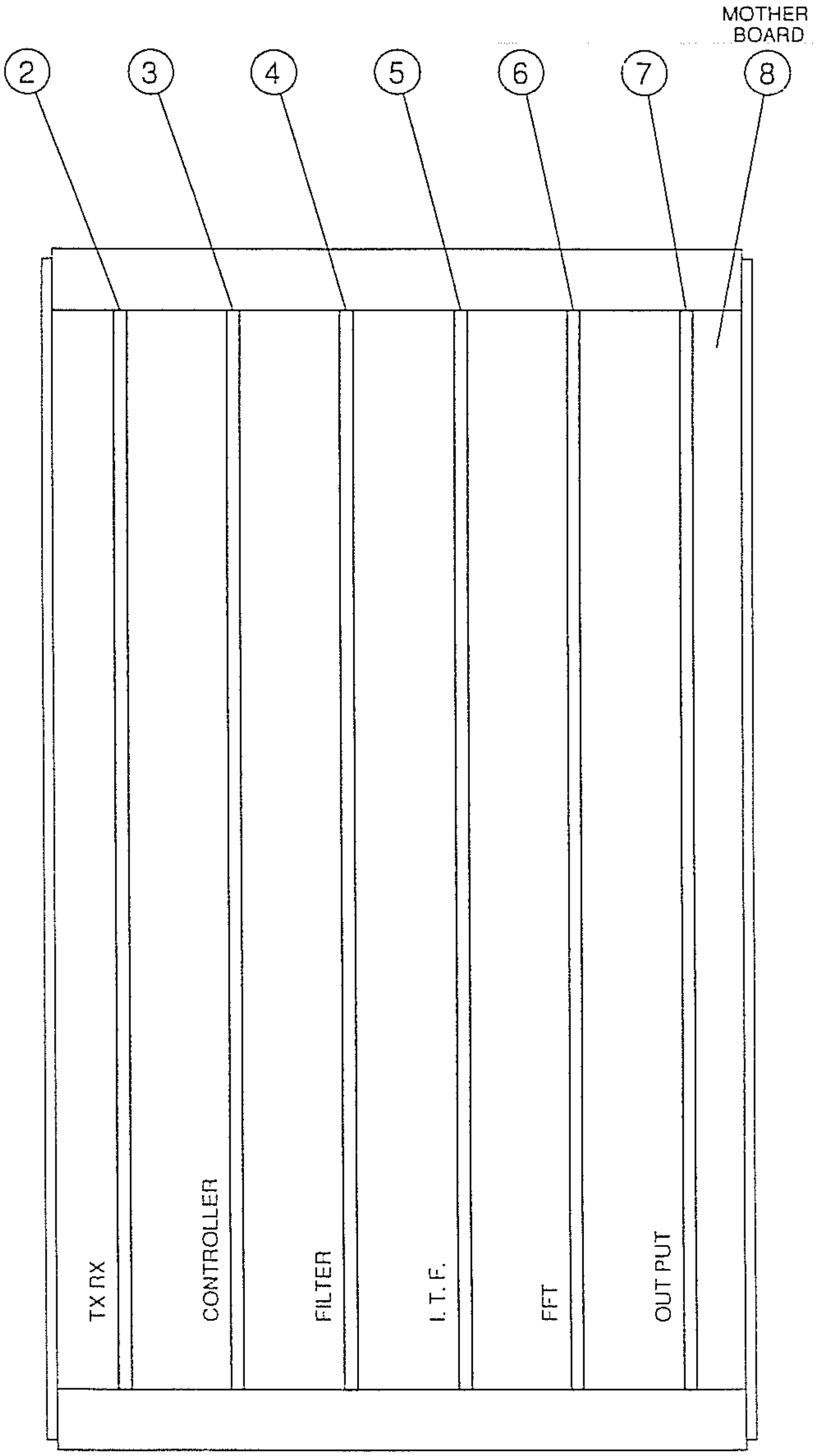
08	SCREWS & SMALL PARTS	UNIT	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
	A140091	TR-16-8-16	CABLECLAMP:INDEX 01		
	A140090	TRCC-23-11-14	CABLECLAMP:INDEX 01,03		
	A622000	UL-13	CABLECLAMP:INDEX 01,05		
	A622001	UL-23	CABLECLAMP:INDEX 01		
	A383112	W12	WASHER:W12		
	A383103	W3	WASHER:W3		
	A383105	W5	WASHER:W5		
	A381306	W6	WASHER:W6		

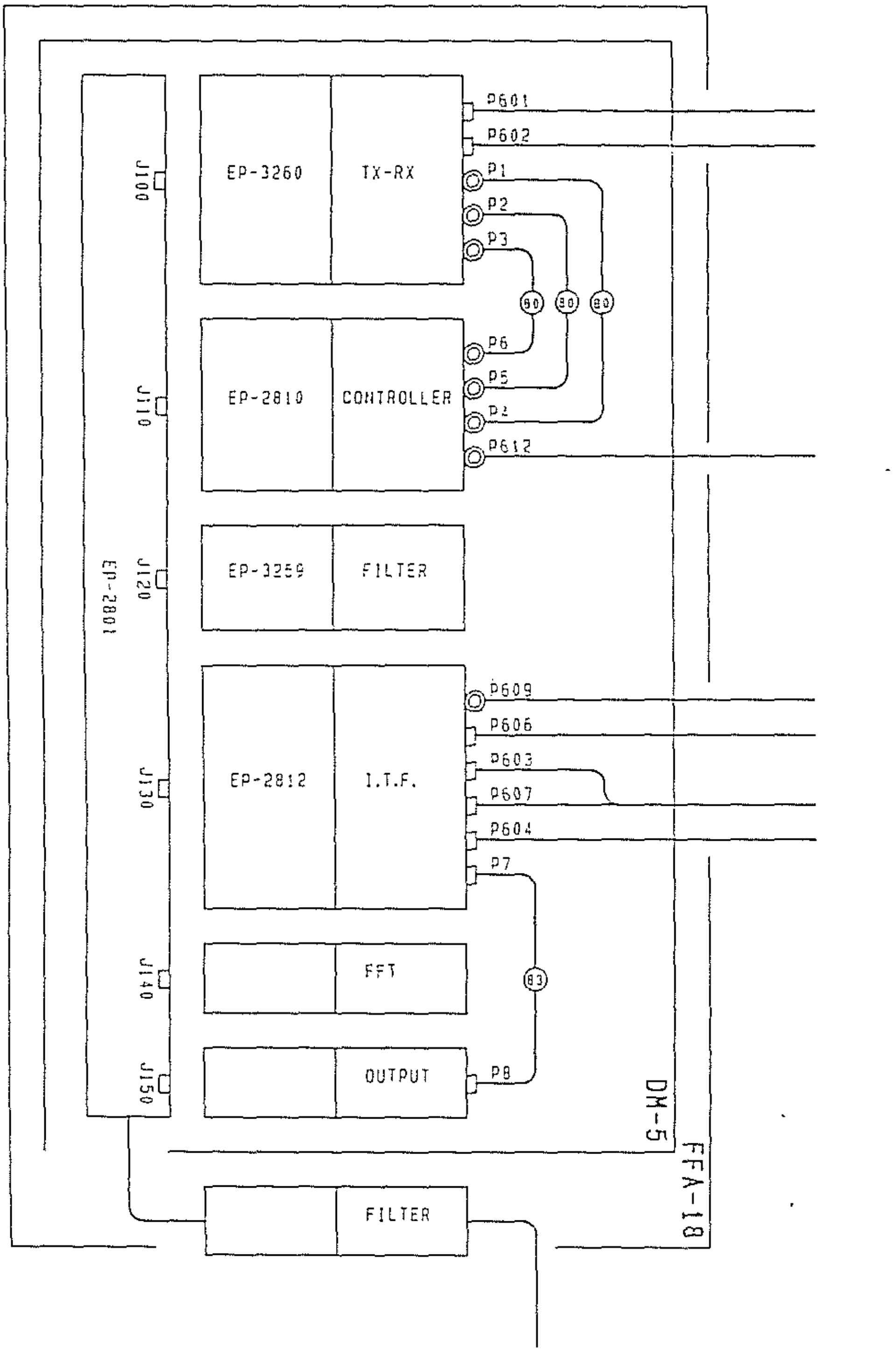
※ means ASSEMBLY PARTS. .
アッセンブリーパーツ .

09	PCB UNIT	UNIT UGR-680	S / N

① UNIT ASSY


MOTHER BOARD
②
③
④
⑤
⑥
⑦
⑧
TX RX
CONTROLLER
FILTER
I. T. F.
FFT
OUT PUT

DOPPLER UNIT
UGR-680


EP-3260
TX-RX
P601
P602
P1
P2
P3
80
80
80
EP-2810
CONTROLLER
P6
P5
P4
P612
EP-3259
FILTER
EP-2812
I.T.F.
P609
P606
P603
P607
P604
P7
83
FFT
OUTPUT
P8
J100
J110
J120
J130
J140
J150
EP-2801
DM-5
FFA-18
FILTER

09	DOPPLER UNIT	UNIT UGR-680	S/N

ITEM	CODE NO.	PARTS NO.	DESCRIPTION	SERIAL NO.	SPEC.
1	A800976	UGR-680	UNIT ASSY		
2	A800977	EP-3260	PCB:TX, RX		
3	A800986	EP-2810-3	PCB:CONTROLLER		
4	A800978	EP-3259	PCB:FILTER		
5	A800941	EP-2812	PCB:I.T.F.		
6	A650003	NJK-196A-FFT	PCB:FFT BOARD		
7	A800990	NJK-196A-OUT PUT	PCB:OUT PUT BOARD		
8	A800178	EP-2808	PCB:MOTHER BOARD		
80	A800207	NCS-3305	CABLE:J1-J4, J2-J5, J3-J6	~	
83	A800208	L-CABLE-222-06	CABLE:J7-J8	~	

※ means ASSEMBLY PARTS.
アッセンブリーパーツ

14-1 Outline of system

14-1-1 Features

In addition to high quality of black/white image, the flow of blood is displayed in color at high sensitivity. At the same time of blood flow display in color, analysis of blood flow velocity can be made by the conventional doppler spectrum method. Compact and light-weight color-doppler equipment for abdominal use. It is the very convenient equipment with color-doppler, suited for general clinical examinations.

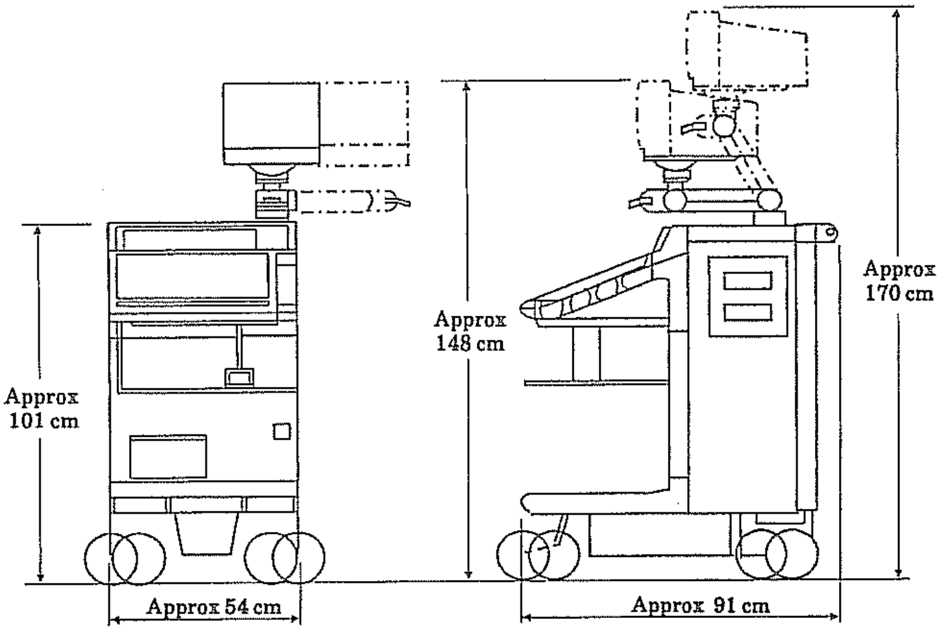
14-1-2 Main applications

General abdominal examinations
  For observing blood flow in the liver and peripheral blood vessels.
General obstetric and gynecologic examinations
  For observing blood flow in the uterus and/or fetus.
General urogenital examinations
  For observing blood flow in the kindney.
Peripheral vessel examinations
  For observing blood flow in carotid artery and jugular vein, hands and feet.
Others
  For examinations during operation, for the trans-eshophageal examinations, etc.

14-1-3 Type

Type and grade of protection against electrical shocks
  Class I, BF type

14-1-4 Dimensions



14-2 System Components

Standard Components

Main unit	SSD-680EX (incl. Monitor IPC-1010 (NTSC) or IPC-1010V (PAL))
Probe	UST-959-3.5 (Electronic convex probe) Abdominal region use, Visual field 60°, Curvature 60R
Isolation transformer	PTU-004

Optional Accessories

B/W monitor	DIS-4 (incl. following components) 1) IP-1230B-TH(NTSC) or IP-1230BV-TH(PAL) 2) Mounting arm 1 set
ECG signal display unit	PEU-680B (incl. following components) 1) Body : EU-5026 2) PCB : EP-2841* 3) Cables
B/W camera	SSZ-600BU (for NTSC) SSZ-600BUV (for PAL) (-P : POLAROID, -35 ; 35mm camera)
B/W printer	SSZ-305 (100~120V) SSZ-305E (200~240V)
Color camera	SSZ-203 (-PA : Polaroid Auto, -FA : Fuji, -P : Polaroid Manual, -35 : mm camera)
Color Echo Copier	SSZ-700 (NTSC) SSZ-700E (PAL) Fixture : MP-2728
Multi format camera	SSZ-111
Foot switch	MP-2614

Optional probes

Electronic convex sector probes

UST-958-7.5	Peripheral Vascular
UST-960-5	Pediatric abdomen
UST-961-5	Neurosurgery
UST-962-5	Transesophageal
UST-964P-5	OB/GYN/IVF (Transvaginal)
UST-965-3.5	Heart
UST-966-3.5	Abdomen, OB/GYN, Heart
UST-967-5	Neonatal head
UST-968P-5	Neurosurgery (burr-hole puncture)
UST-969-5	Neurosurgery
UST-970-7.5	Neurosurgery, Peripheral Vascular
UST-667P-5	End-fire transrectal puncture

Electronic linear probes

UST-5042-3.5	General abdomen
UST-5043P-3.5	Puncture
UST-5518-7.5	Peripheral Vascular
UST-5525-7.5	Steered linear for Peripheral Vascular
UST-5817-5	Pediatrics
UST-576T-7.5	Intraoperative (T-shape)
UST-577-7.5	Small part
UST-5523-7.5	Laparoscopic

Electronic Convex sector / Linear probe

UST-666-5/7.5	Prostate (Transrectal/ bi-plane)

Independent CW Doppler probe

UST-2262-2	CW spectral Doppler

15-1 Specification

1	Power supply	100V (50/60Hz), 115V (50/60Hz), 220V (50/60Hz) 1000VA maximum
2	Weight	Approx. 155 kg
3	Viewing monitor	10" color TV monitor (R, G, B input)
4	Scanning method	Linear electronic scan Convex electronic scan Independent (for CW)
5	Number of probes attachable simultaneously	2 probes + Independent
6	Image display	B, 2B, 3B, 4B and respective blood flows displayed in color B/M, B/D, B flow/D (simultaneous and alternate display) M, D
7	Transmit/Receive unit	
a	Number of circuits	Max. 120
b	Number of blocks oscillated simultaneously	Max. 48
c	Transmitting method	B/W picture : Single Color, doppler : Burst for color line and PW doppler (Single for B/W line)
d	Focus	Electronic focus (Tx. 4 stages, Rx. 16 stages)
8	Image memory	512×512×6bit ×3 (for B/W image, Velocity, and Variance use) and Cine memory
9	External output	Four B/W composite outputs Two R, G, B, SYNC outputs Two NTSC or PAL outputs One doppler sound audio output One Y/C output for S-VHS VTR One RS232C output

10 Functions

1) General matters of image display

- a Polarity of image Positive/negative reversible(for M and Doppler image only)
- b Direction of displayed image Changeable in UP/DWN and RIGHT/LEFT directions
- c Automatic display information
  - Name of hospital
  - Date and time
  - * Probe frequency
  - * B/W gain (B)
  - * Transmission power (Rate indicated)
  - * Contrast (B, M)
  - Number of B-picture frames (Color mode only)
  - Active mark
  - Direction mark
  - Position location (when position is shifted)
  - Display scale marks (Vertical & horizontal marks at 1 cm or 5 cm steps)
  - Focus information (Set value and depth)
  - * Maximum doppler velocity (Doppler mode only, corrected angle value)
  - Velocity marks (Doppler mode only, at 10 cm/s or 50 cm/s steps)
  - Time mark (M or doppler mode only, at 0.5 sec steps)
  - Doppler incidence angle (When setting of angle)
  - Spectrum invert (when invert is made)
  - Maximum color flow velocity (Color mode only)
  - R-wave delay (when setting of synchronism of heartbeats)
  - Heart rate (when ECG signal is input)
  - Gray scale bar
  - Color bar (Flow mode only)

  * mark items can be erased.

d	ID display	Max. 8 characters × 4 lines	(NTSC)
		Max. 19 characters × 2 lines	(PAL)
e	Comment display	Max. 52 characters × 32 lines	(NTSC)
		Max. 44 characters × 32 lines	(PAL)

f	Auxiliary display	Body marks	ABDOMEN	4 marks
			OB/GY	7 marks
			HEAD	5 marks
			BREAST	3 marks
			Selectable marks for sample picture	
			Selectable by trackball	
		Puncture Guide line	1-line display (correspondence to each angle)	

g	Word display (ANOTATION)	ABDOMEN	10 words
		OB/GY	10 words
		PV	10 words
		Other	10 words

All words are those of registered by the user.

h	PRESET	5 kinds of preset can be set up by the user. Maximum four of probes specified for each preset can be selected. Giving priority to measurements and voluntary arrangement of them possible.

2) B/W image adjustments

a	GAIN	Continuously variable with volume (B and M independent)
b	STC	11-stage slide volume (B and M in common)
c	CONTRAST	7-stage rotary switch (B and M independent)
d	AGC	Continuously variable with volume (B and M independent)
e	PRE-PROCESS	4 stages (B and M in common)
f	POST-PROCESS	4 stages (B and M in common)
g	Frame correlation	OFF / LOW / HIGH selectable
h	Magnifying power of display	×0.75, ×1, ×1.5, ×2 (B and flow in common)
i	Zoom function	Maximum ×2 (1B and 1B flow only) For M, maximum ×2 by WINDOW magnification possible.
j	Shift of POSITION	B and M (Impossible during flow)
k	ECHO ERASE	M only
l	FTC	B and M
m	Sweep Speed	4 stages (M and DOP in common)
n	GAMMA	Monitor (View gamma) 3 types , Camera (Photo gamma) 3 types

3) Color image adjustments

Pre-process

a	GAIN	Continuously variable with volume
b	Magnifying power	×0.75, ×1, ×1.5, ×2 (B and flow in common)
c	Speed range	±3 cm/s (7MHz, PRF 0.5kHz) to ±131 cm/s (3.5MHz, PRF 12kHz)
d	PRF	0.5, 0.75, 1, 1.25, 1.5, 2, 3, 4, 6, 8, 12kHz
e	AVERAGE	LOW (8 times)、 MID (12 times)、 HIGH (14 times) HORI (8times) selectable
f	WALL FILTER	LOW / MID1 / MID2 / HIGH selectable
g	Frame correlation	OFF / LOW / MID / HIGH selectable
h	Zoom function	Maximum ×2
i	Display area selection	Selection of 25%, 35%, 50%, or 80% against B/W display area is possible. Shifting the display area right or left and trimming the bottom side possible. Color display area is able to follow up PW sample volume.
j	Spacial filter	OFF / LOW / MID / HIGH selectable
k	Line density	2 types
l	Application selection	2 types (abdominal and cardiac use)

Post-process

m	Selection of display color	Velocity dispersion indication 2 types Velocity emphasis indication 2 types (Enhance 5 types) Dispersion indication
n	EDGE process	Giving priority to B/W display or to color display
o	REJECT	Maximum 15/31 levels (common to tward flow and away flow)

4) Doppler image adjustments

a	Indication	Power spectrum only
b	GAIN	Continuously variable with volume (AGC action)
c	PW velocity range	±5 cm/s (7MHz, PRF 1kHz) to ±273 cm/s (3.5MHz, PRF 25kHz) Automatically set to HPRF mode.
d	CW speed range	up to approx. 10 m/s
e	WALL FILTER	50, 100, 200, 400, 800Hz
f	SAMPLE VOLUME	1, 2, 3, 5, 10mm (PW only)
g	PRE-COMP	4 stages
h	REJECT	0~14
i	BASE LINE SHIFT	64 stages
j	INVERT function	available
k	SWEEP SPEED	4 stages (common to M)
l	Indication unit	m/s, cm/s, kHz

5) Others

a	ECG synchronization	When connected to ECG signal display unit (PEU-680B)

6) Measurements

a Number of calipers 4 types

b B-mode measurements

DIST	Distance measurement
AREA-T	Area and circumference : Tracing method
AREA-E	Area and circumference : Ellipse approximation method
VOL	Volume measurement
OB	Obstetrical calculation : Incorporates obstetrics report function
HIST	Histogram : Trace method, box method
RATIO	Ratio calculation
%STEN	Stenosis ratio calculation

c M-mode measurements

DIST	Distance, time, and velocity
%STEN	Stenosis ratio calculation
RATIO	Ratio calculation
H-RATE	Heart rate measurement
POMBO	Left ventricle function calculation : POMBO formula
TEICH	Left ventricle function calculation : TEICHHOLZ formula

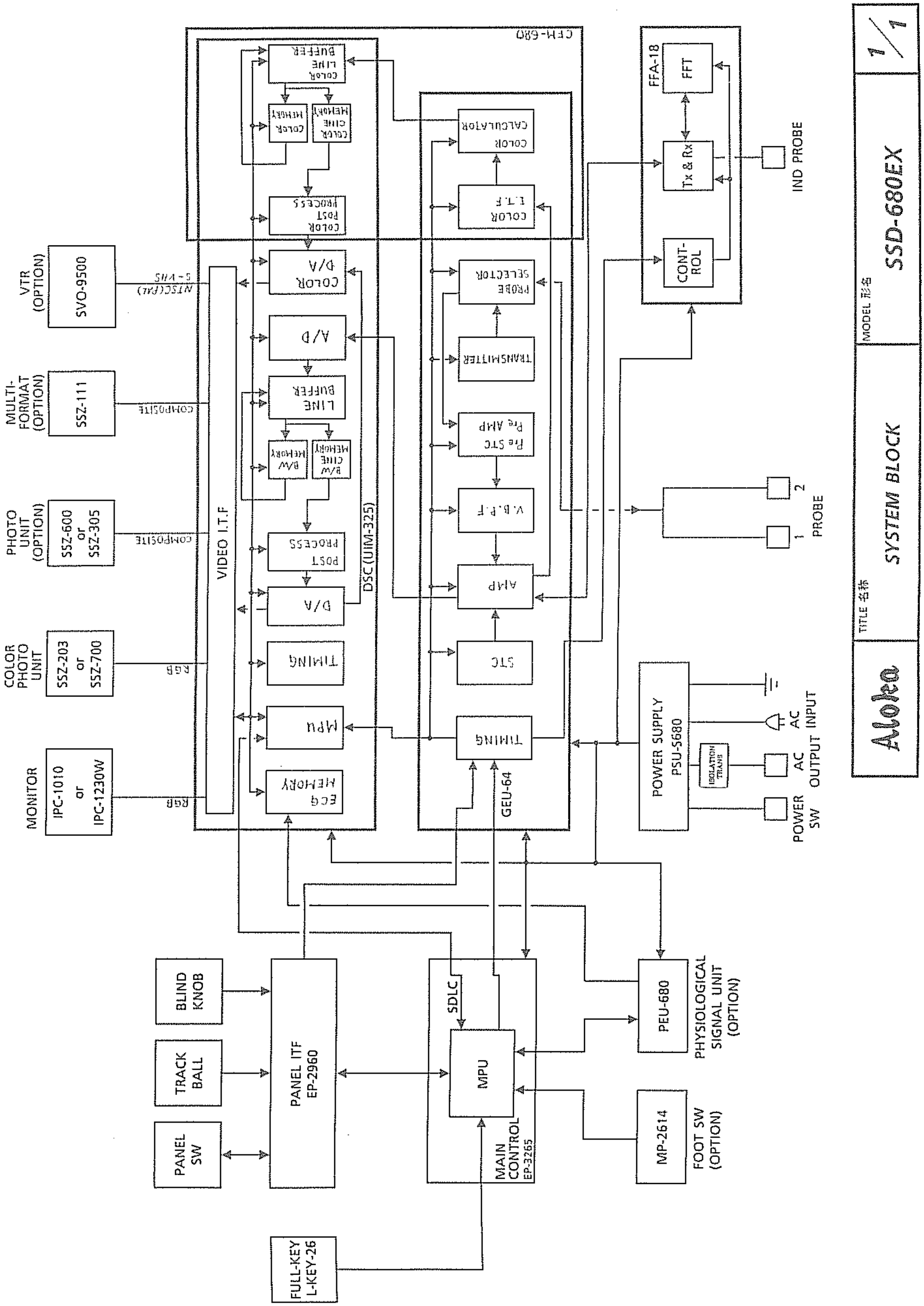
d DOP-mode measurement

VEL	Velocity measurement
F-VOL	Stroke volume, cardiac output calculation
AVERG	Average flow velocity calculation
ACCEL	Acceleration measurement
PUL-IND	Pulsatility index (Peripheral blood vessel calculation)
POU-IND	Pourcelot index (Peripheral blood vessel calculation)
PATIO	Ratio calculation
P-GRAD	Pressure gradient (Valve orifice area calculation)

15-2 SYSTEM DESCRIPTION

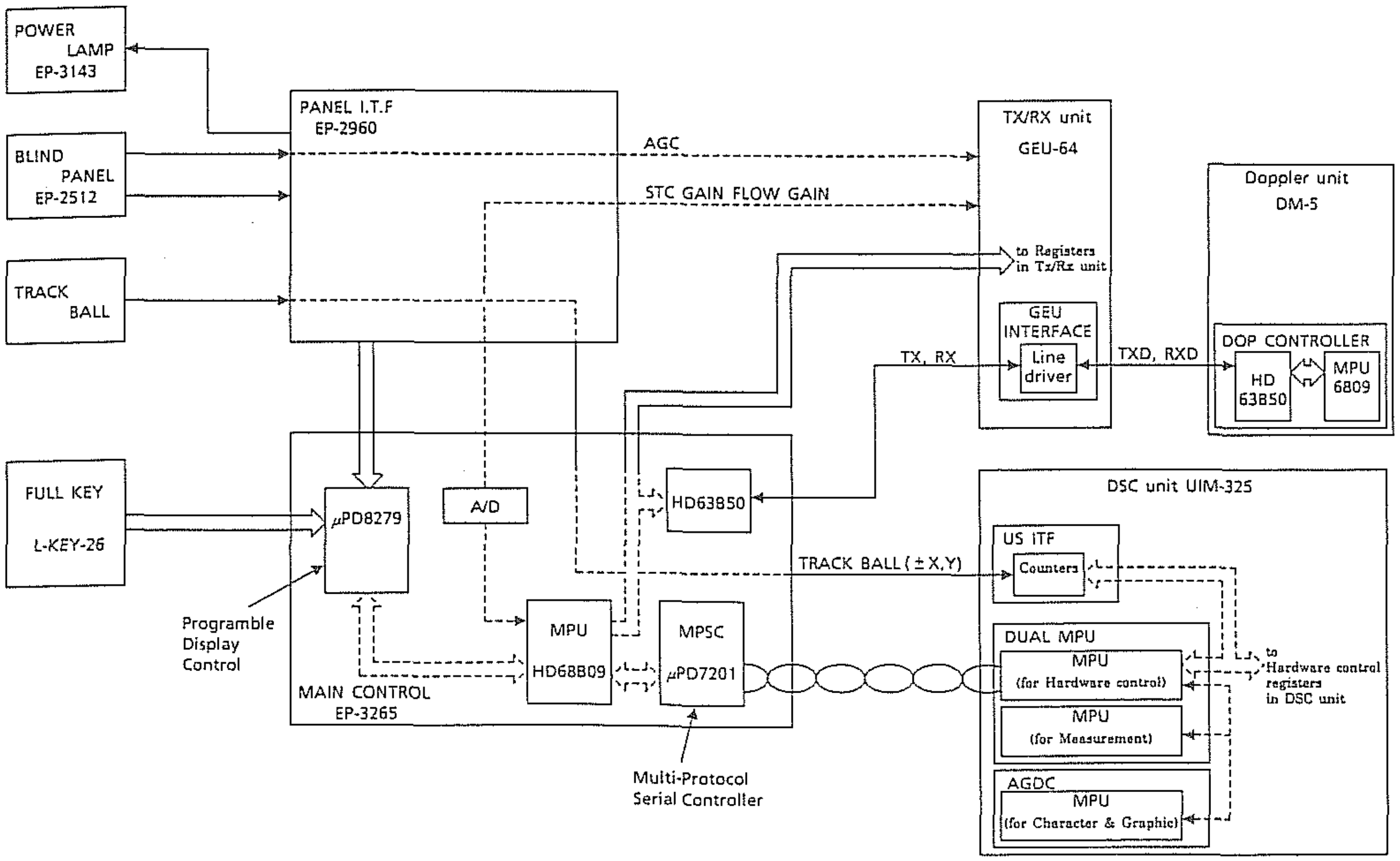
15-2-1 Description of System

This equipment consists of the transmitter-receiver unit (GEU-64), the doppler unit (FFA-18), the DSC unit (UIM-325), the color operation unit (CFM-680), the system control unit, the panel including the keyboard and switches, the camera unit, the physiological signal unit (option), the foot switch (option), the monitor, and the power supply unit.
The TRANSMITTER-RECEIVER UNIT (GEU-64) generates timing signal, necessary for the doppler and color operation units, and timing signal for electronic scanning which controls repetition of transmission and receiving. The unit also amplifies the received signal, applies necessary image processing to the amplified signal, and sends the processed signal to the DSC.
The DOPPLER UNIT (FFA-18) performs frequency analysis of the received signal and then returns the signal to the transmitter-receiver unit (GEU-64). It has also the transmission circuit for CW doppler.
The COLOR OPERATION UNIT (CFM-680) performs frequency analysis of the received signal, converts the signal into a signal necessary for color display, and stores the signal data in Main memory and Cine memory. The stored data is read out in time with TV timing, converted to the RGB signal, and added to B/W signal.
The DSC UNIT (UIM-325) converts the ultrasound analog signal into the digital signal and stores the signal data in Main memory and Cine memory. The stored image data is read out in time of TV timing, treated by image processing (POST PROCESSING), and mixed with the character signal and color doppler signal to form the RGB signal which is input to the monitor.
The SYSTEM CONTROL UNIT gathers the panel conditions (mode, magnification, etc.)
The KEYBOARD outputs the character information input with keys to the character generator in the DSC unit through the system control unit.
The CAMERA unit is SSZ-203 series or SSZ-700 which is used for taking color pictures by using the RGB signal; SSZ-600BU-P/35 in which a 3.5 inch TV monitor is combined with an Polaroid camera or 35-mm film camera; or SSZ-305 which uses a thermal head to allow high-speed hard copy of monitor picture to thermalprinting paper.
ECG SIGNAL DISPLAY UNIT (option) has the function of simultaneously displaying the ECG waveform on M- or B-mode image and the function of synchronizing the ECG.
The POWER UNIT consists of the series power supply and switching power supply. Transmitter voltage can be adjusted with a knob in the blind panel.


MONITOR
IPC-1010 or IPC-1230W
COLOR PHOTO UNIT
SSZ-203 or SSZ-700
PHOTO UNIT (OPTION)
SSZ-600 or SSZ-305
MULTI-FORMAT (OPTION)
SSZ-111
VTR (OPTION)
SVO-9500
RGB
RGB
COMPOSITE
COMPOSITE
NTSC(PAL)
S-VHS
VIDEO I.T.F
DSC (UIM-325)
ECG MEMORY
MPU
TIMING
D/A
POST PROCESS
B/W MEMORY
B/W CINE MEMORY
LINE BUFFER
A/D
COLOR D/A
COLOR POST PROCESS
COLOR MEMORY
COLOR CINE MEMORY
COLOR LINE BUFFER
CFM-680
GEU-64
TIMING
STC
AMP
V.B.F
Pre STC Pre AMP
TRANSMITTER
PROBE SELECTOR
COLOR I.T.F
COLOR CALCULATOR
FFA-18
FFT
Tx & Rx
CONT-ROL
IND PROBE
1
2
PROBE
POWER SUPPLY PSU-5680
ISOLATION TRANS
AC INPUT
AC OUTPUT
POWER SW
BLIND KNOB
TRACK BALL
PANEL SW
PANEL ITF EP-2960
SDLC
MPU
MAIN CONTROL EP-3265
FULL-KEY L-KEY-26
PEU-680
PHYSIOLOGICAL SIGNAL UNIT (OPTION)
MP-2614
FOOT SW (OPTION)
Aloka
TITLE 名称
SYSTEM BLOCK
MODEL 形名
SSD-680EX
1/1

15-2-2 Panel Information signal flow

Each information given at the panel switches, track ball, control knobs, and keyboard is sent to the MAIN CONTROL PCB (EP-3265) . In EP-3265, the PANEL INFORMATION CONTROL MPU (68B09) receives information from the panel switches and keyboard through the PROGRAMMABLE KEYBOARD/DISPLAY CONTROL IC, and sends back the response signal through the LAMP DRIVER in the MAIN CONTROL PCB (EP-3265) so that the related LAMPS are turned on. There are three lines of GAIN signal. Two of the three lines send GAIN signal through the A/D converter to the DATA BUS which carries above-mentioned information signals together with the gain signal to the DSC UNIT (UIM-325). While the analog signals are sent, together with STC and AGC signals, directly to the TRANSMITTER-RECEIVER UNIT (GEU-64). Track-ball information (±X, ±Y) is sent through the MAIN CONTROL PCB (EP-3265) to the DSC UNIT (UIM-325). The CONTRAST control signal is decoded and carried on the DATA BUS.


POWER LAMP EP-3143
BLIND PANEL EP-2512
TRACK BALL
FULL KEY L-KEY-26
PANEL I.T.F EP-2960
AGC
STC GAIN FLOW GAIN
TX/RX unit GEU-64
to Registers in Tx/Rx unit
GEU INTERFACE
Line driver
TX, RX
TXD, RXD
Doppler unit DM-5
DOP CONTROLLER
HD 63B50
MPU 6809
μPD8279
A/D
HD63B50
MPU HD68B09
MPSC μPD7201
MAIN CONTROL EP-3265
Programble Display Control
Multi-Protocol Serial Controller
TRACK BALL (±X,Y)
DSC unit UIM-325
US ITF
Counters
DUAL MPU
MPU (for Hardware control)
MPU (for Measurement)
AGDC
MPU (for Character & Graphic)
to Hardware control registers in DSC unit

Aloka

TITLE 名称

PANEL INFORMATION DATA FLOW

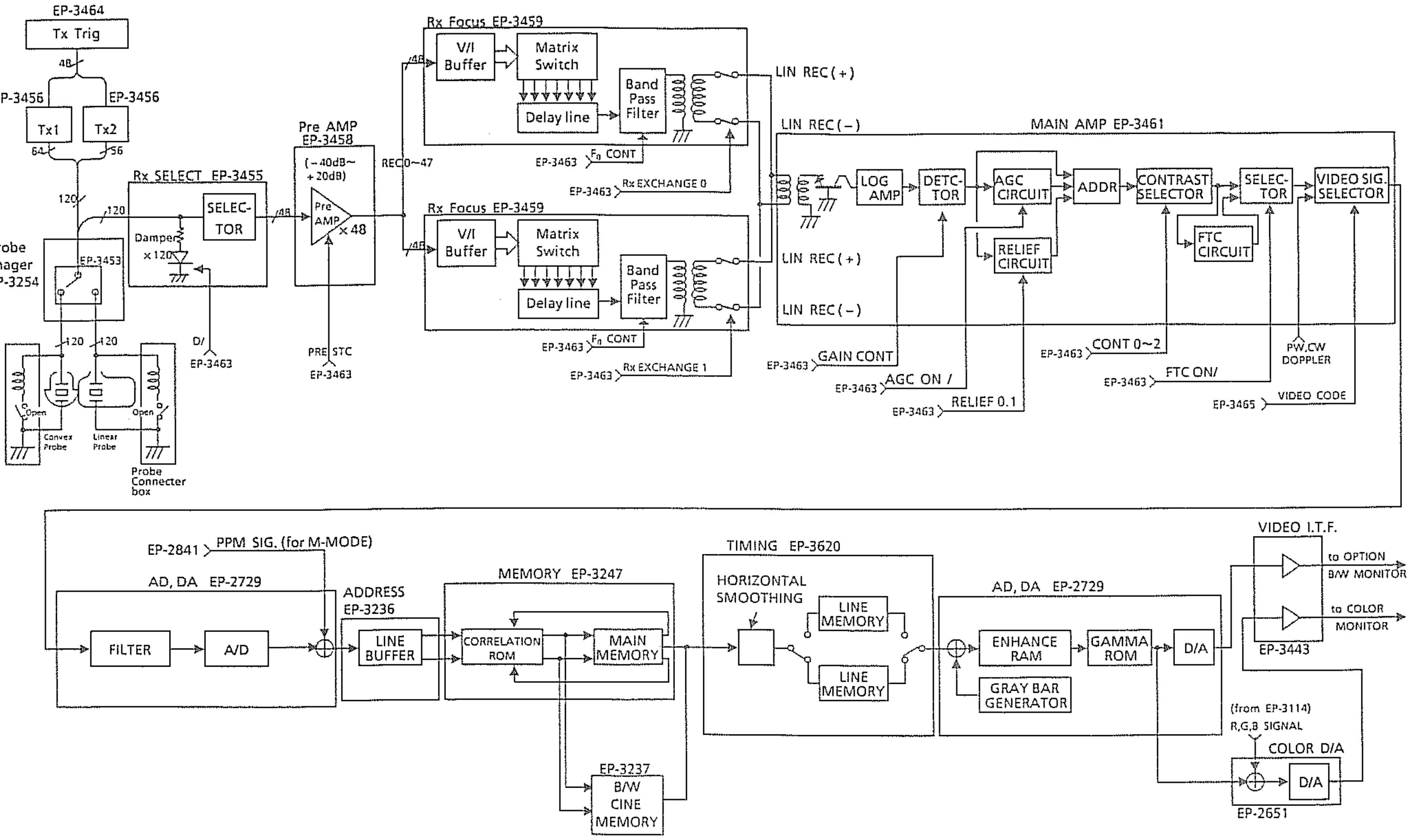
MODEL 形名

SSD-680EX

1/1

15-2-3 B/W signal flow

48 echo signal lines which the probe receives are selected from 120 lines in the RX SELECT (EP-3455), and amplified in the Pre AMP (EP-3458). The signal is then sent to the RX FOCUS (EP-3459) where dynamic focusing and variable-aperture focusing are made to bring the received echo into focus at intervals of approx.1cm. EP-3459 has also the VBPF circuit which increases the resolution of short-distance echos by taking out rather high frequency component form echo signals and increases the sensitivity of long-distance echos by taking out rather low frequency component from echo signals. Then, the signal is sent to the MAIN AMP (EP-3461) where the signal from EP-3459 is received by an unbalancing trans and, after passing through the LOG AMP and DETECTOR circuit, the signal is processed by the PRE PROCESS circuit including the AGC, RELIEF, FTC circuit and CONTRAST selection circuit.
Then, the signal is sent to the A/D, D/A (EP-2729) in the DSC (UIM-325) for filtration and digital conversion, and the signal data is stored in the LINE BUFFER MEMORY in the ADDRESS (EP-3236). Then, the signal data is read out in time with write cycle of the MAIN MEMORY and is written in to the MAIN MEMORY(EP-3247) and the CINE MEMORY(EP-3237). Readout of the MAIN MEMORY and CINE MEMORY are syschrouzed with TV signal and readout of 16 pixels is made at the same time. Pixels read out from MAIN MEMORY are fed back for Frame correlation. Pixels read out from CINE MEMORY are brought in P-S conversion and then outputted as data for two lines. The upper-line data or the lower-line data is selected by the FIELD SWITCHING signal in the TIMING (EP-3620) and then smoothing is made in the horizontal direction of TV. SMOOTHING DATA is sent to the A/D, D/A (EP-2729) where addition of GRAY SCALE BAR, ENHANCE processing, are made. After that OVLY/ signal, SYNC signal, BLANK signal, and IMAGE AREA signal are added to data, it's converted to RGB singal, and D/A conversion is made at COLOR DA (EP-2651). Finally, the data is sent to the VIDEO ITF (EP-3443) and outputted to the color monitor.


EP-3464
Tx Trig
48
EP-3456
EP-3456
Tx1
Tx2
64
56
120
120
Probe chager EP-3254
EP-3453
120
120
Convex Probe
Linear Probe
Open
Open
Probe Connecter box
Rx SELECT EP-3455
SELEC-TOR
Damper
×120
D/
EP-3463
48
Pre AMP EP-3458
(−40dB~+20dB)
Pre AMP
×48
PRE STC
EP-3463
REC0~47
48
48
Rx Focus EP-3459
V/I Buffer
Matrix Switch
Delay line
Band Pass Filter
EP-3463
F0 CONT
EP-3463
Rx EXCHANGE 0
Rx Focus EP-3459
V/I Buffer
Matrix Switch
Delay line
Band Pass Filter
EP-3463
F0 CONT
EP-3463
Rx EXCHANGE 1
LIN REC(+)
LIN REC(−)
LIN REC(+)
LIN REC(−)
MAIN AMP EP-3461
LOG AMP
DETC-TOR
AGC CIRCUIT
RELIEF CIRCUIT
ADDR
CONTRAST SELECTOR
FTC CIRCUIT
SELEC-TOR
VIDEO SIG. SELECTOR
EP-3463
GAIN CONT
EP-3463
AGC ON /
EP-3463
RELIEF 0.1
EP-3463
CONT 0~2
EP-3463
FTC ON/
PW,CW DOPPLER
EP-3465
VIDEO CODE
EP-2841
PPM SIG. (for M-MODE)
AD, DA EP-2729
FILTER
A/D
ADDRESS EP-3236
LINE BUFFER
MEMORY EP-3247
CORRELATION ROM
MAIN MEMORY
EP-3237
B/W CINE MEMORY
TIMING EP-3620
HORIZONTAL SMOOTHING
LINE MEMORY
LINE MEMORY
AD, DA EP-2729
ENHANCE RAM
GAMMA ROM
D/A
GRAY BAR GENERATOR
VIDEO I.T.F.
to OPTION B/W MONITOR
to COLOR MONITOR
EP-3443
(from EP-3114)
R,G,B SIGNAL
COLOR D/A
D/A
EP-2651

Aloka

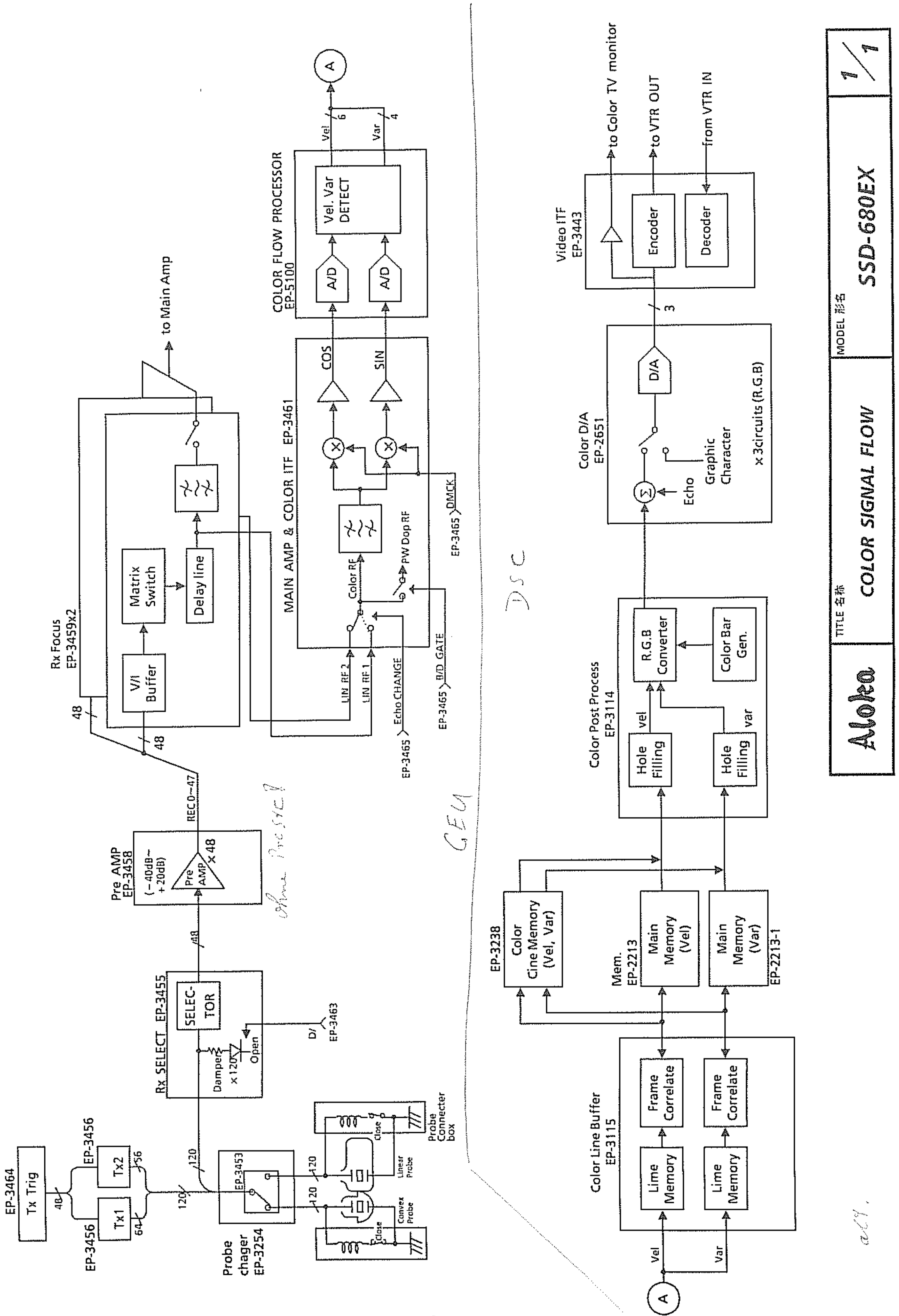
TITLE 名称
B/W SIGNAL FLOW

MODEL 形名
SSD-680EX

1/1

15-2-4 COLOR SIGNAL FLOW

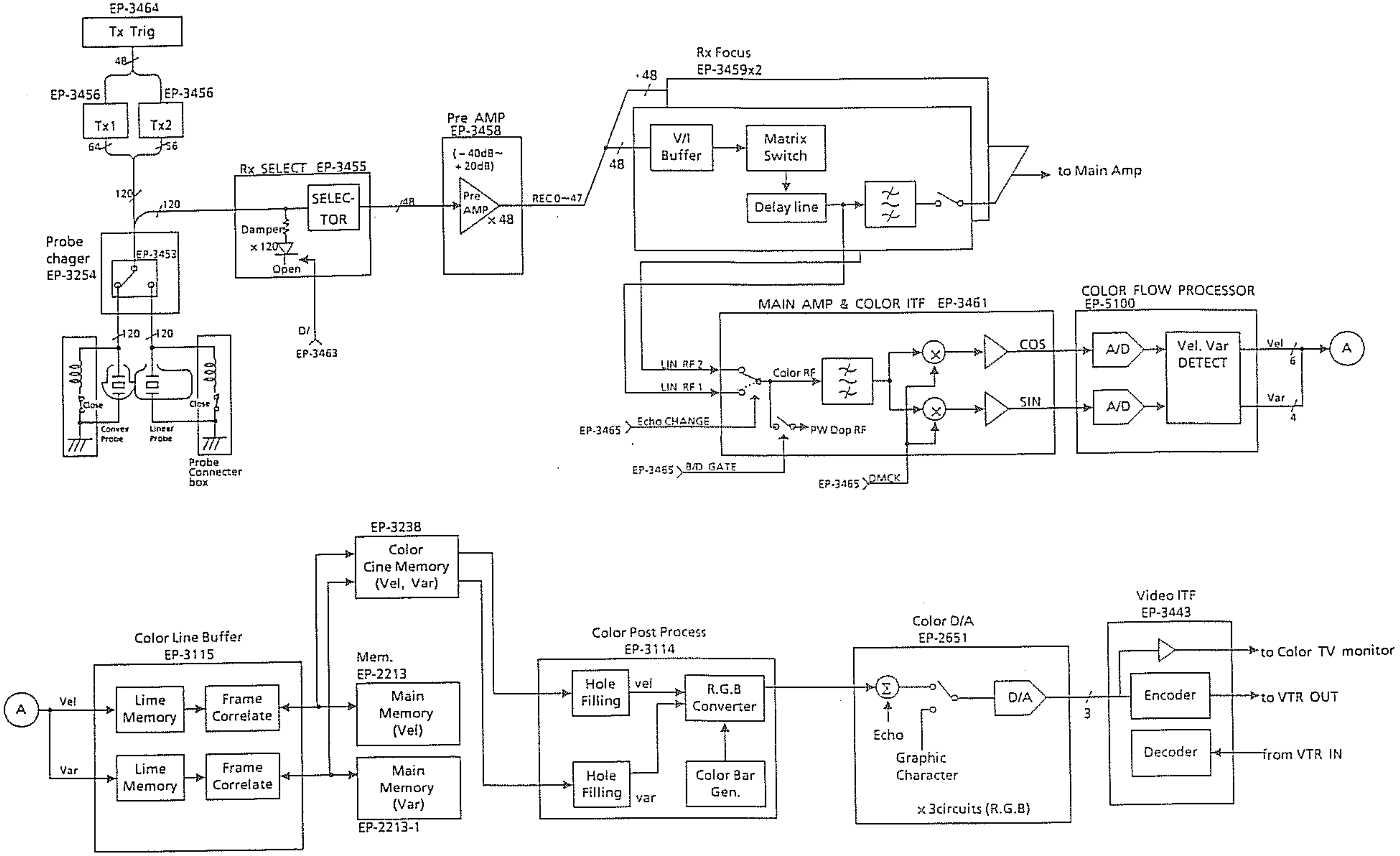
In the color signal mode, the Tx-Rx signals are restricted to a narrow band width to increase color sensitivity. This is realized by interposing the coils in parallel with transducers and disconnecting the damping resistor in the receiver pre-stage. The coils having the fixed values suited to individual probes and of the quantity corresponding to the number of transducer elements are in the connector box. All coils are forcibly connected in the color signal mode by relays which are also installed in the connector box. The damping resistor is on the RX SELECT PCB, which is switched on or off by diode switch so that it is switched off only when color signal is transmitted and received. The Pre-STC by the Pre-Amp is kept released for the purpose of increasing S/N ratio by increase of amplification at the initial stage.
The received signal which is delayed and added in the Rx Focus PCB is sent to the MAIN AMP & COLOR ITF board as LIN RF1 or LIN RF2 signal before VBPF.
In the MAIN AMP & COLOR ITF board, the signals are alternately switched for color receiving focus and sent to Color ITF circuit. In Color ITF circuit, the signal is restricted in band width by the BPF set for the respective frequencies, and then divided into sine component and cosine component by quadrature detector. The signal is then sent to the CFM Processor after the variable-gain amplifier. In the CFM processor, the signal is brought in A/D conversion and then into digital calculation process for detection of Velocity and Variance data. Digital signal is sent to the DSC.
In the DSC, frame correlation is taken by the Color Line Buffer, and then Velocity and Variance data are written in the respective Main Memory and the respective Cine Memory in the form of ultrasound raster. Read out from Main Memory and Cine Memory is in the TV scanning method, so that conversion into color output R,G, and B is made, depending on values of velocity and variance, after smoothing by the Color Post Process. Finally, the signal is combined with the echo signal and graphic picture, and then converted into analog signal in the Color D/A PCB.


EP-3464
Tx Trig
48
EP-3456
Tx2
56
EP-3456
Tx1
64
120
Probe chager EP-3254
EP-3453
120
120
120
Convex Probe
Linear Probe
Close
Close
Probe Connecter box
Rx SELECT EP-3455
SELEC-TOR
Damper x120
Open
D/ EP-3463
48
Pre AMP EP-3458
(−40dB~+20dB)
Pre AMP
x48
REC 0~47
48
48
Rx Focus EP-3459x2
V/I Buffer
Matrix Switch
Delay line
to Main Amp
MAIN AMP & COLOR ITF EP-3461
LIN RF 2
LIN RF 1
Color RF
PW Dop RF
COS
SIN
Echo CHANGE
EP-3465
B/D GATE
EP-3465
DMCK
EP-3465
COLOR FLOW PROCESSOR EP-5100
A/D
A/D
Vel. Var DETECT
Vel
6
Var
4
A
ohne Presel?
CEU
DSC
A
Vel
Var
Color Line Buffer EP-3115
Lime Memory
Frame Correlate
Lime Memory
Frame Correlate
EP-3238
Color Cine Memory (Vel, Var)
Mem. EP-2213
Main Memory (Vel)
Main Memory (Var)
EP-2213-1
Color Post Process EP-3114
Hole Filling
vel
Hole Filling
var
R.G.B Converter
Color Bar Gen.
Color D/A EP-2651
Σ
Echo
Graphic Character
D/A
x 3circuits (R.G.B)
3
Video ITF EP-3443
Encoder
Decoder
to Color TV monitor
to VTR OUT
from VTR IN
Aloka
TITLE 名称
COLOR SIGNAL FLOW
MODEL 形名
SSD-680EX
1/1

15-2-5 PW (CW) SIGNAL FLOW

In the PW signal mode, the Tx-Rx system acts just like in the color signal mode. That is, connection of coils by relay action and disconnection of the damping resistor and pre-STC are made. Received signal is sent from the Rx Focus PCB to the doppler unit through the buffer in the Main Amp PCB, like in the case of the color signal mode.

In the Doppler Unit, received signal is restricted in band width by the Tx & Rx PCB, and then is processed by quadrature detector and, furthermore, by tracking and holding at the position suited to doppler sampling. After passing through the wall filter, the signal is filtered, depending on velocity range, and brought into A/D conversion in the Filter PCB. The signal is sent to the FFT PCB, where FFT and post-process are made, and then to the Interface PCB where the signal is brought into average process in the sweep direction and D/A conversion. Finally in the Main Amp PCB, the analog information signal alternates with echo signal.

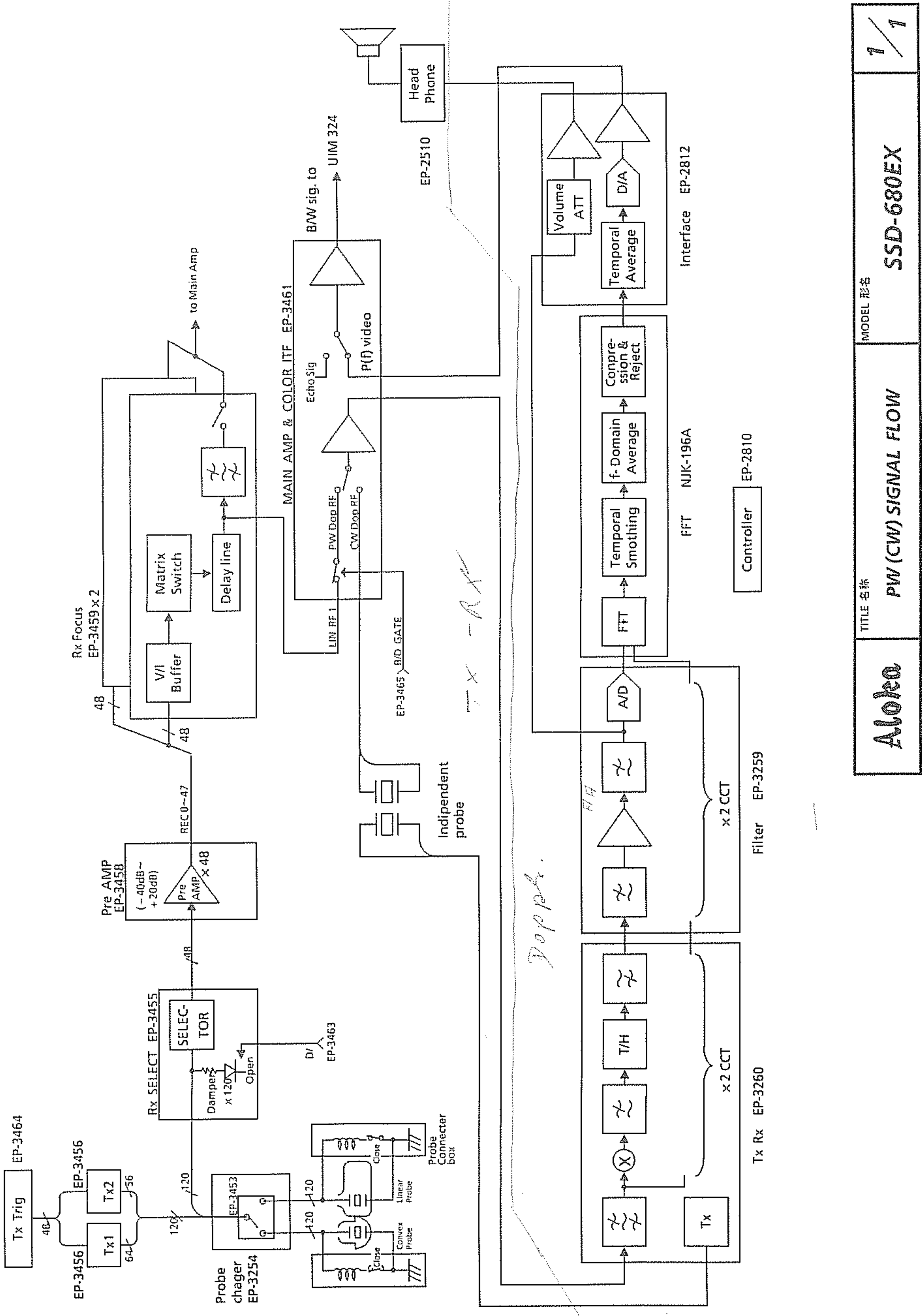

EP-3464
Tx Trig
48
EP-3456
EP-3456
Tx1
Tx2
64
56
120
120
Probe
chager
EP-3254
EP-3453
120
120
Close
Close
Convex Probe
Linear Probe
Probe Connecter box
Rx SELECT EP-3455
SELEC-TOR
Damper
× 120
Open
D/
EP-3463
48
Pre AMP
EP-3458
(−40dB~ +20dB)
Pre AMP
× 48
REC 0~47
48
48
Rx Focus
EP-3459x2
V/I Buffer
Matrix Switch
Delay line
to Main Amp
MAIN AMP & COLOR ITF EP-3461
LIN RF 2
LIN RF 1
Color RF
PW Dop RF
EP-3465 Echo CHANGE
EP-3465 B/D GATE
EP-3465 DMCK
COS
SIN
COLOR FLOW PROCESSOR
EP-5100
A/D
A/D
Vel. Var DETECT
Vel
6
Var
4
A
A
Vel
Var
Color Line Buffer
EP-3115
Lime Memory
Frame Correlate
Lime Memory
Frame Correlate
EP-3238
Color Cine Memory (Vel, Var)
Mem.
EP-2213
Main Memory (Vel)
Main Memory (Var)
EP-2213-1
Color Post Process
EP-3114
Hole Filling
vel
Hole Filling
var
R.G.B Converter
Color Bar Gen.
Color D/A
EP-2651
Echo
Graphic Character
D/A
× 3circuits (R.G.B)
3
Video ITF
EP-3443
Encoder
Decoder
to Color TV monitor
to VTR OUT
from VTR IN

Aloka | TITLE 名称 COLOR SIGNAL FLOW | MODEL 形名 SSD-680EX | 1/1

15-2-5 PW (CW) SIGNAL FLOW

In the PW signal mode, the Tx-Rx system acts just like in the color signal mode. That is, connection of coils by relay action and disconnection of the damping resistor and pre-STC are made. Received signal is sent from the Rx Focus PCB to the doppler unit through the buffer in the Main Amp PCB, like in the case of the color signal mode.

In the Doppler Unit, received signal is restricted in band width by the Tx & Rx PCB, and then is processed by quadrature detector and, furthermore, by tracking and holding at the position suited to doppler sampling. After passing through the wall filter, the signal is filtered, depending on velocity range, and brought into A/D conversion in the Filter PCB. The signal is sent to the FFT PCB, where FFT and post-process are made, and then to the Interface PCB where the signal is brought into average process in the sweep direction and D/A conversion. Finally in the Main Amp PCB, the analog information signal alternates with echo signal.


Aloka
TITLE 名称
PW (CW) SIGNAL FLOW
MODEL 形名
SSD-680EX
1/1
Tx Trig
EP-3464
48
Tx1
Tx2
EP-3456
EP-3456
64
56
120
Probe chager
EP-3254
EP-3453
120
120
120
Convex Probe
Linear Probe
Close
Close
Probe Connecter box
Rx SELECT EP-3455
SELEC-TOR
Damper x120
Open
D/ EP-3463
48
Pre AMP
EP-3458
(−40dB~+20dB)
Pre AMP
x48
REC 0~47
48
48
Rx Focus
EP-3459 x 2
V/I Buffer
Matrix Switch
Delay line
to Main Amp
MAIN AMP & COLOR ITF EP-3461
LIN RF 1
PW Dop RF
CW Dop RF
Echo Sig
P(f) video
B/W sig. to
UIM 324
EP-3465 B/D GATE
Indipendent probe
EP-2510
Head Phone
Tx - Rx
Doppl.
Tx
Tx Rx EP-3260
T/H
x 2 CCT
Filter EP-3259
A/D
x 2 CCT
FFT
Temporal Smoothing
f-Domain Average
Conpre-ssion & Reject
FFT NJK-196A
Controller EP-2810
Temporal Average
D/A
Volume ATT
Interface EP-2812

15-2-6 DSC UNIT

(1) DSC specification

A. MEMORY CAPACITY 512×512×6BIT(1PCB)
(B/W, velocity, and variance data need the respective PCBs --Three PCBs in total)

B. PROCESSING

Update algoryth	Frame correlation Average B/W, velocity, and variance are independent.
Velocity and Variance data calculation	
Line interpolation	Up to 11 points possible.
Gamma correction	On monitor Setting possible by means of software Camera Setting possible with ROM
Color post process	Color rejection, Color display(4 kinds), Color enhance

C. PICTURE MAGNIFICATION (Write zoom) ×1, ×1.5, ×2, ×3

D. DISPLAY

Gray scale bar	64 degrees
Color gray	16 degrees
Characters	52×32 (NTSC), 44×32 (PAL)
Graphic	640×480 dots (NTSC), 560×480 dots (PAL)

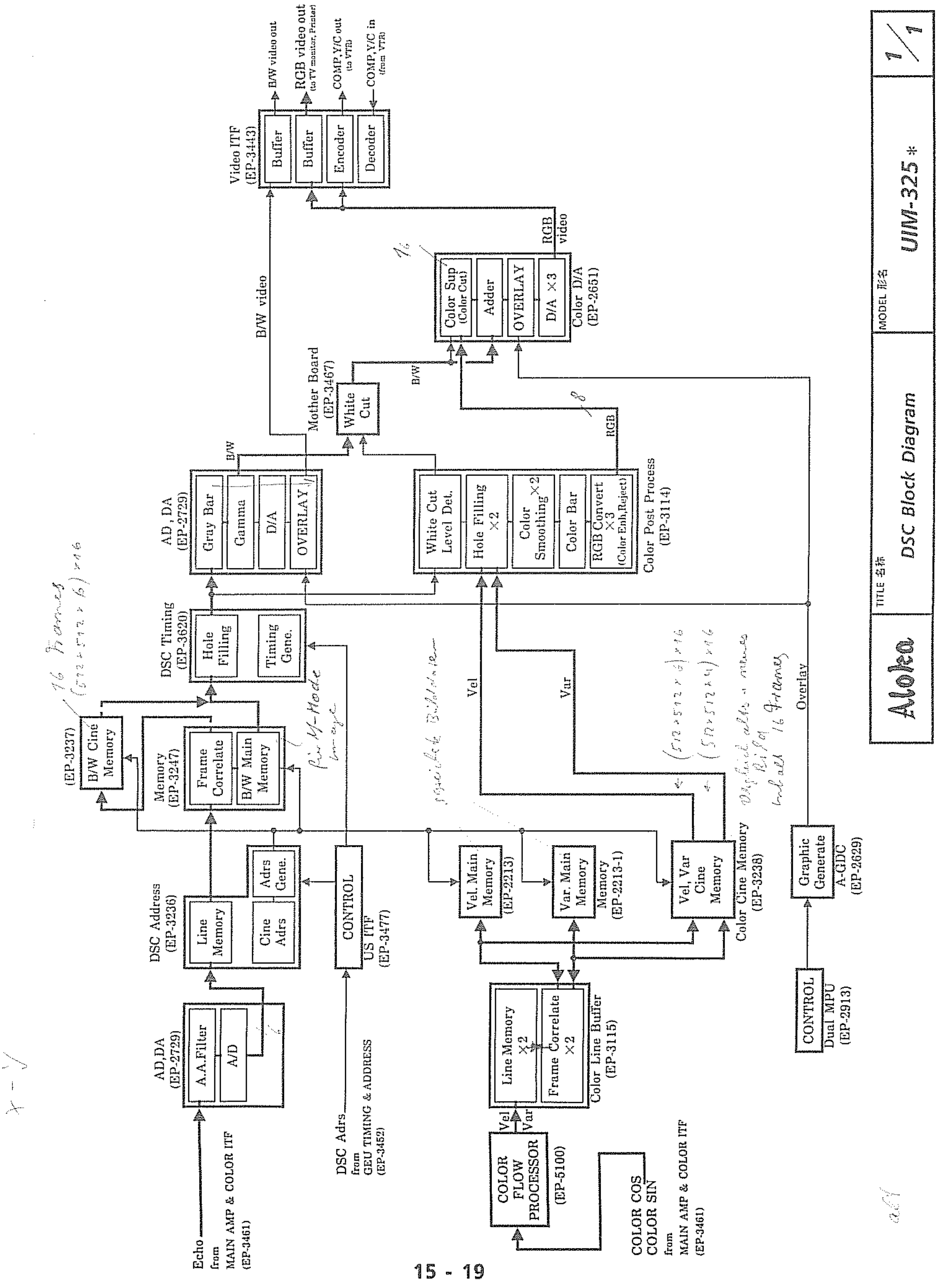
E. NUMBER OF IMAGES DISPLAYED 1, 2, 3, 4 patterns possible (Multi image)

F. OUTPUT

RGB	3 lines	
Y/C	1 line (NTSC or PAL)	
Composit	Color	2 lines
	B/W	POST 4 line
		NEGA 1 line

G. CINE MEMORY (One PCB is used for B/W, and one PCB is used for Velocity/Variance.)

Search for B mode	16 screens (When Store memory is off.)
Scroll for M,D mode	Maximally 256 seconds image (When Store memory is off.)
Store memory	4 screens


Echo from MAIN AMP & COLOR ITF (EP-3461)
AD,DA (EP-2729)
A.A.Filter
A/D
DSC Address (EP-3236)
Line Memory
Cine Adrs
Adrs Gene.
DSC Adrs from GEU TIMING & ADDRESS (EP-3452)
CONTROL
US ITF (EP-3477)
Memory (EP-3247)
Frame Correlate
B/W Main Memory
(EP-3237)
B/W Cine Memory
DSC Timing (EP-3620)
Hole Filling
Timing Gene.
AD, DA (EP-2729)
Gray Bar
Gamma
D/A
OVERLAY
B/W
Mother Board (EP-3467)
White Cut
B/W video
Video ITF (EP-3443)
Buffer
Buffer
Encoder
Decoder
B/W video out
RGB video out (to TV monitor, Printer)
COMP,Y/C out (to VTR)
COMP,Y/C in (from VTR)
Color D/A (EP-2651)
Color Sup (Color Cut)
Adder
OVERLAY
D/A ×3
RGB video
B/W
RGB
Color Post Process (EP-3114)
White Cut Level Det.
Hole Filling ×2
Color Smoothing ×2
Color Bar
RGB Convert ×3 (Color Enh,Reject)
Vel
Var
Overlay
COLOR FLOW PROCESSOR (EP-5100)
Vel
Var
COLOR COS COLOR SIN from MAIN AMP & COLOR ITF (EP-3461)
Color Line Buffer (EP-3115)
Line Memory ×2
Frame Correlate ×2
Vel. Main Memory (EP-2213)
Var. Main Memory (EP-2213-1)
Vel, Var Cine Memory
Color Cine Memory (EP-3238)
Graphic Generate
A-GDC (EP-2629)
CONTROL
Dual MPU (EP-2913)
16 Frames
(512×512×6)×16
(512×512×4)×16
(512×512×4)×16
16 frames
16
8
Aloka
TITLE 名称
DSC Block Diagram
MODEL 形名
UIM-325 *
1/1

(2) Principle of DSC operation

This DSC operates in the same manner (X-Y type) as the former 300 series DSC. The US video (analog signal) from the transmitter- receiver unit and the velocity, variance signals (digital signals) from the color calculator unit are temporarily stored in the memory, processed, and then outputted. Two kinds of output signals are the composite signal and RGB signal(for color display).

A. Writing to the memory

One US scanning line is handled as a vector, which is indicated by Xo, Yo(origin), △X (X-direction component) and △Y (Y-direction component). Write address is determined by the address counter of the ADDRESS PCB. Two independent counters are used; one for X-direction address and the other for Y-direction address. Data Xo and Yo are the initial values of the respective address counters. In ADDRESS PCB clocks determined by △X and △Y actuate those counters to update address.

On the other hand, US video signal is converted into digital signal by the A/D, D/A PCB and sent to the ADDRESS PCB, while velocity and variance signals from the COLOR Flow Processor PCB are sent to the COLOR LINE BUFFER PCB, and temporarily stored in the respective LINE BUFFER MEMORYs. The velocity and variance data are read out in time with the write cycle of the MEMORY PCB and written in to the MEMORY PCB and the CINE MEMORY PCB. In this case, velocity and variance data arrive the MEMORY PCB several μ sec later as compared with the arrival of the US video signal. (Analog delay caused by calculation time spent in the color calculator circuit and BPF of color ITF.) The US video signal and the velocity and variance signals are synchronized with each other during they stay in the LINE BUFFERS and they are outputted to the MEMORY PCB and the CINE MEMORY PCB in the same timing.

This DSC usually writes in two pixels every write cycle. Since 16 pixels surrounded with solid lines are the memory elements different from each other as shown in Fig. 20, it is possible to access 16 pixels simultaneously by feeding one kind of address. It is impossible to write in two pixels at the same time beyond the 16-pixel area surrounded with solid lines. In certain circumstances, only one pixel exists in the same area. Three MEMORY PCBs are used; they are for US video signal, velocity signal, and variance signal, respectively. The PCB for US video signal includes the frame correlation circuit in addition to the main memory.

B. Read from the memory

Read address is also generated in the ADDRESS PCB for 16 pixels simultaneously in time with the TV signal. The 16 pixels are those surrounded with solid lines as shown in Fig. 20. Read out pixels, after they are subjected to parallel-serial conversion, are outputted from the MEMORY PCB or the CINE MEMORY PCB as 2-line data. " In Timing" (for US video) and "Color post process" (for velocity and variance data), the upper and lower lines of output data are selected by the TV field selection signal , and then smoothing is made in the horizontal direction of TV signal. For Velocity and Variance data, Frame interpolation is made after the horizontal smoothing.

US smoothing data, to which the gray scale bar signal is added in the A/D, D/A PCB, are enhanced and then converted into analog data. Thereafter, the data is formed into the composite TV video signal by addition of the OVLY/signal (characters and graphic), sync signal, blank signal, and image area signal.

Velocity and variance smoothing data are converted into the RGB signal and, after additions of US data and OVLY/ signal in the COLOR D/A PCB, it is fed to the color monitor through the video ITF.

C. Xo, Yo, △X, △Y

Data Xo, Yo, △X, △Y necessary for writing to the MEMORY depend on the magnification of image, etc. The table of those data is stored in the ROM of US ITF PCB. In this ROM, various conditions including magnification corresponding to the panel are set up by the CPU, and US address is set up as ROM address by the CPU. Output data (Xo, Yo, △X, △Y) are sent to the ADDRESS PCB.

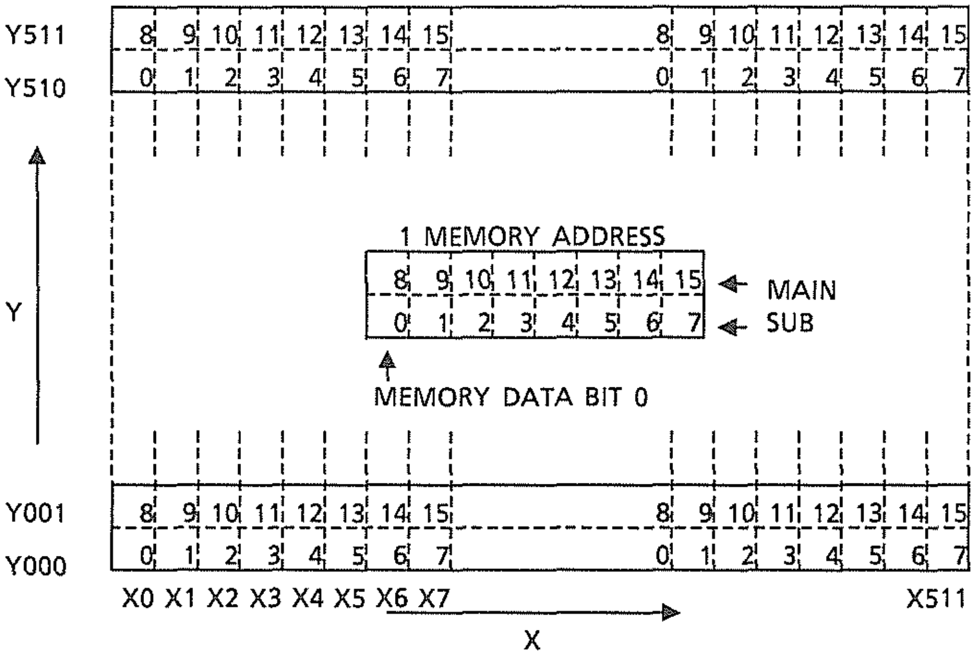
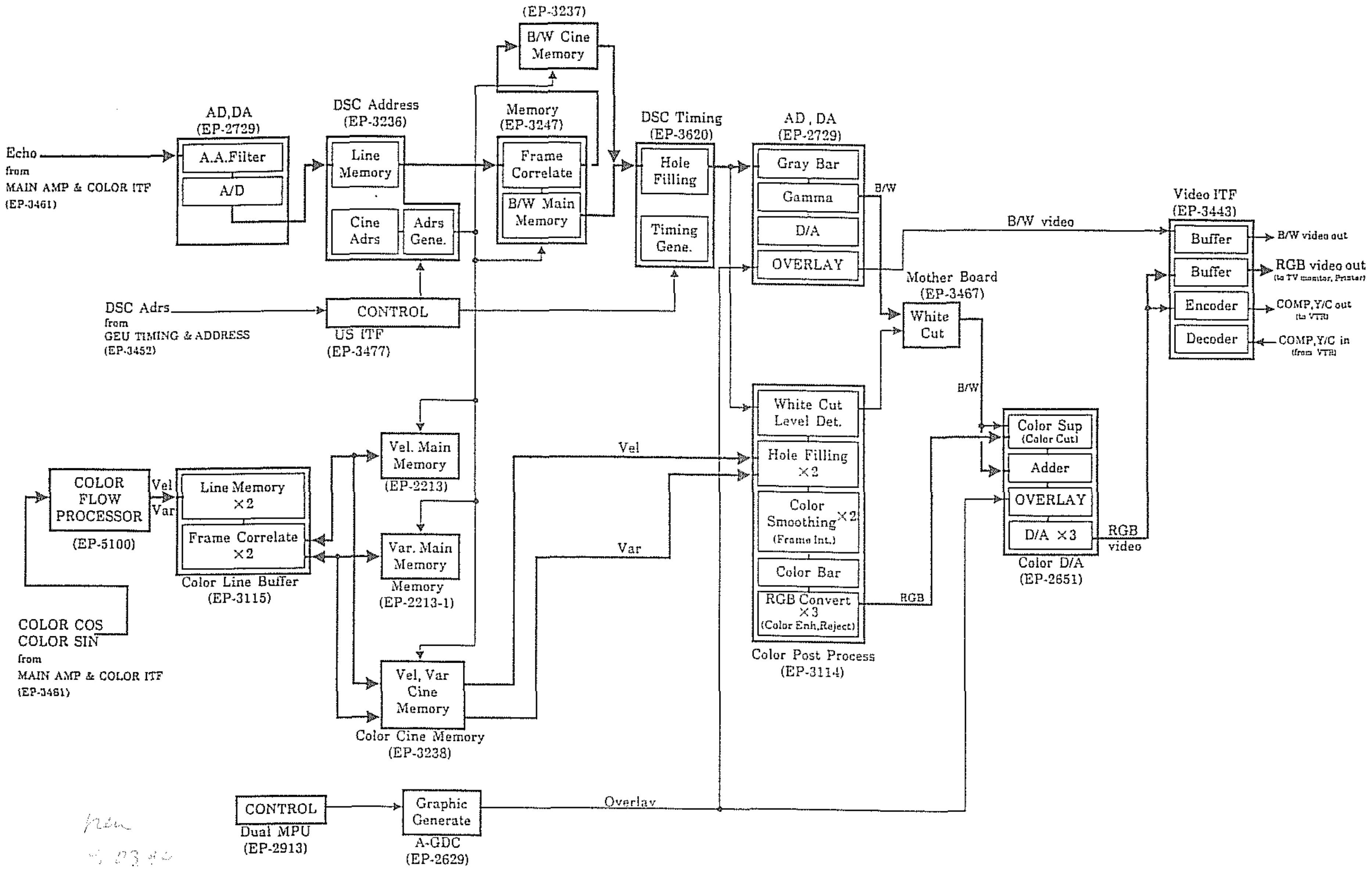

Y511
Y510
Y
Y001
Y000
8 9 10 11 12 13 14 15
0 1 2 3 4 5 6 7
1 MEMORY ADDRESS
MAIN
SUB
MEMORY DATA BIT 0
X0 X1 X2 X3 X4 X5 X6 X7
X511
X

FIG. 20


Echo
from
MAIN AMP & COLOR ITF
(EP-3461)
AD,DA
(EP-2729)
A.A.Filter
A/D
DSC Address
(EP-3236)
Line Memory
Cine Adrs
Adrs Gene.
DSC Adrs
from
GEU TIMING & ADDRESS
(EP-3452)
CONTROL
US ITF
(EP-3477)
(EP-3237)
B/W Cine Memory
Memory
(EP-3247)
Frame Correlate
B/W Main Memory
DSC Timing
(EP-3620)
Hole Filling
Timing Gene.
AD , DA
(EP-2729)
Gray Bar
Gamma
D/A
OVERLAY
B/W
B/W video
Mother Board
(EP-3467)
White Cut
Video ITF
(EP-3443)
Buffer
Buffer
Encoder
Decoder
B/W video out
RGB video out
(to TV monitor, Printer)
COMP,Y/C out
(to VTR)
COMP,Y/C in
(from VTR)
COLOR FLOW PROCESSOR
(EP-5100)
Vel
Var
Line Memory ×2
Frame Correlate ×2
Color Line Buffer
(EP-3115)
COLOR COS
COLOR SIN
from
MAIN AMP & COLOR ITF
(EP-3461)
Vel. Main Memory
(EP-2213)
Var. Main Memory
Memory
(EP-2213-1)
Vel, Var Cine Memory
Color Cine Memory
(EP-3238)
Vel
Var
White Cut Level Det.
Hole Filling ×2
Color Smoothing ×2
(Frame Int.)
Color Bar
RGB Convert ×3
(Color Enh,Reject)
Color Post Process
(EP-3114)
RGB
B/W
Color Sup
(Color Cut)
Adder
OVERLAY
D/A ×3
Color D/A
(EP-2651)
RGB video
CONTROL
Dual MPU
(EP-2913)
Graphic Generate
A-GDC
(EP-2629)
Overlay

Aloka | TITLE 名称 DSC Block Diagram | MODEL 形名 UIM-325 * | 1/1

16-1 EP-3265 MAIN CONTROL

1. General

This PCB equipped with HD68B09 (MPU) reads various kinds of information from the control panel, sends out instructions to the PSC unit and transmitter-receiver unit (GEU), and controls turning on or off of panel lamps. It also exchanges information with the doppler unit (through the GEU) and controls the physiological unit (option).

2. Operation

1) MPU (Micro Processing Unit)

The MPU uses HD68B09 (the speedup version of MC6809) which operates at 8 MHz of clock frequency.

2) PTM (Programmable Timer Module)

Using two LSIs HD68B40, the PTM serves as the R/R INTERRUPT TIMER, MPSC TRANSMITTER-RECEIVER CLOCK GENERATOR, and FIRO PROGRAMMABLE TIMER.

3) MPSC (Multi Protocol Serial Controller)

The MPSC using μPD7201 exchanges signals with the PSC unit.

4) GEU INTERFACE

Depending on information given by panel switches, this interface sets up data to be sent to the transmitter-receiver unit.

5) FIPE (FIRQ Priority Encoder)

To increase interruption processing speed, FIPE finds the priority order of interruption, and loads vector address corresponding to interruption input on the ADDRESS BUS.

6) PROGRAMMABLE KEYBOARD/DISPLAY CONTROLLER

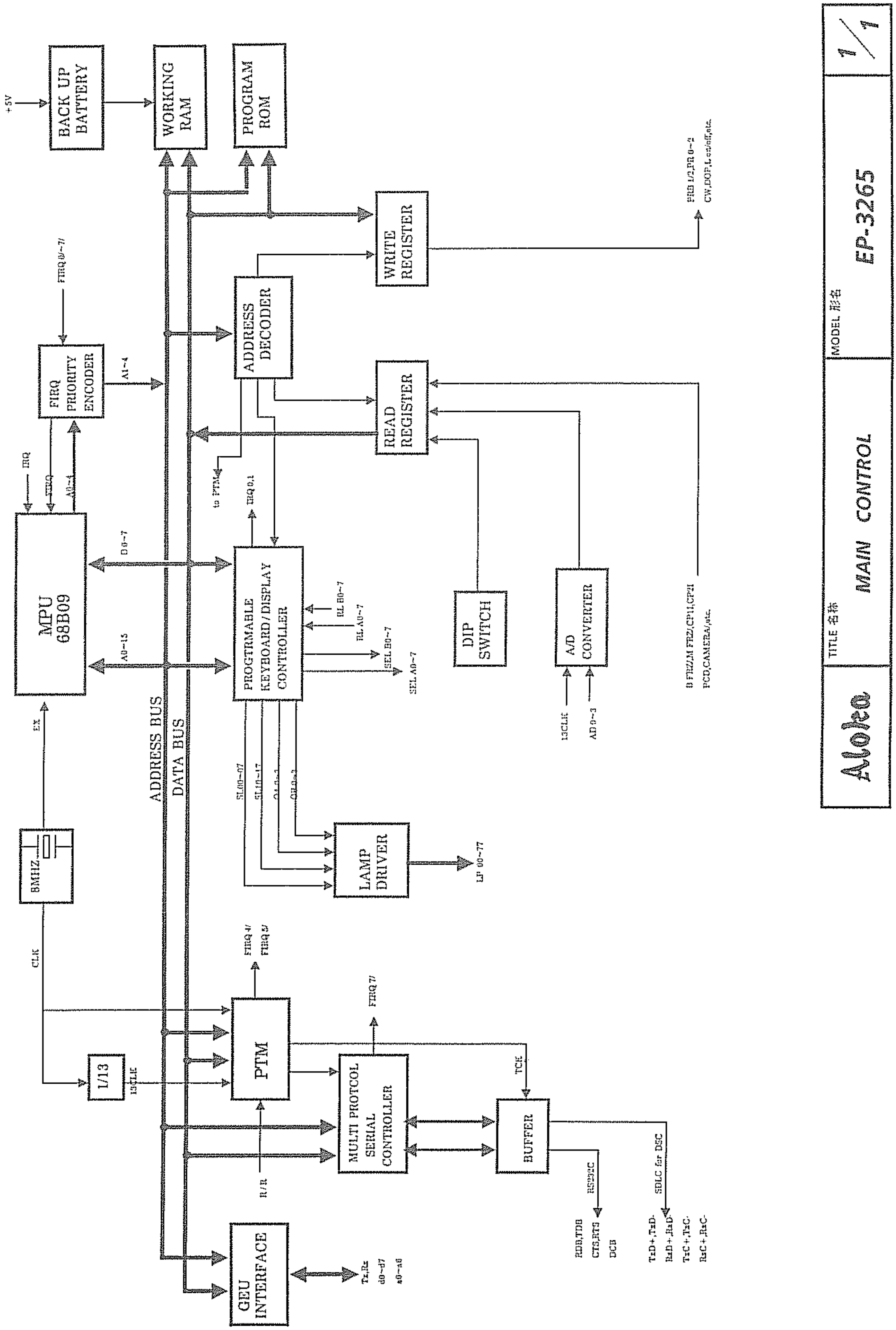
Using two LSIs μPD8279, this controller receives information given by the panel switches and full-deyboard and controls turning on or off of panel lamps.

7) A/D CONVERTER

Converts analog gain data of B-mode and M-mode into digital data which the MPU reads in.

8) BACK-UP BATTERY

To back up the memory when power supply is cut off, a battery is connected to the WORKING RAM of this PCB.


+5V
BACK UP BATTERY
WORKING RAM
PROGRAM ROM
WRITE REGISTER
FRB 1/2,PR 0~2
CW,DOP,L on/off,etc.
FIRQ 0~7
FIRQ PRIORITY ENCODER
A1~4
ADDRESS DECODER
READ REGISTER
IRQ
FIRQ
A0~4
to PTM
FIRQ 0,1
MPU 68B09
D0~7
A0~15
PROGRAMMABLE KEYBOARD / DISPLAY CONTROLLER
RL B0~7
RL A0~7
SEL B0~7
SEL A0~7
DIP SWITCH
A/D CONVERTER
13CLK
AD 0~3
B FRZ/M FRZ,CP11,CP21
PCD,CAMERA,etc.
ADDRESS BUS
DATA BUS
EX
8MHZ
SL00~07
SL10~17
OA 0~3
OB 0~3
LAMP DRIVER
LP 00~77
CLK
FIRQ 4
FIRQ 5
PTM
I/13
13CLK
FIRQ 7
TCK
MULTI PROTCOL SERIAL CONTROLLER
BUFFER
R/R
RS232C
SDLC for DSC
RDB,TDB
CTS,RTS
DCB
TxD+,TxD-
RxD+,RxD-
TxC+,TxC-
RxC+,RxC-
GEU INTERFACE
Tx,Rx
d0~d7
a0~a6
Aloka
TITLE 名称
MAIN CONTROL
MODEL 形名
EP-3265
1/1

16-2 EP-3454 PROBE SELECTOR

(including EP-3453 PROBE SELECT RELAY)

1. General

This board select PROBE 1 or PROBE 2.

2. Operation

1) Probe Selector

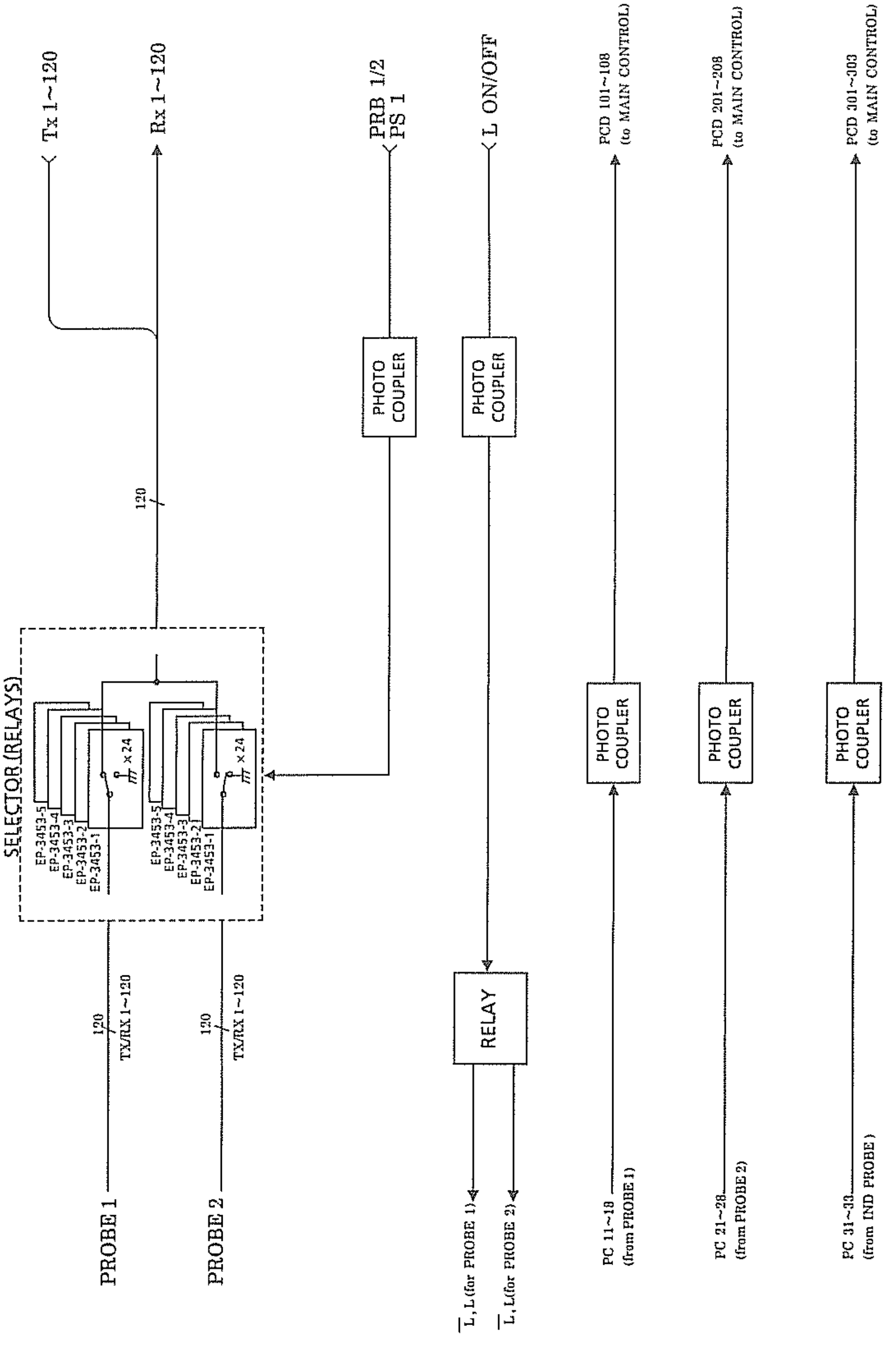
Selector to connect 120 Tx/Rx lines to PROBE 1 or PROBE 2. The relays are equipped on EP--3453.

2) L ON/OFF CONTROL circuit

This circuit output the control signal to turn on the coil inside probe, in PW doppler or Color doppler.

3) Photo coupler for reading Probe code

Probe codes form PROBE CONNECTOR 1, 2, and IND PROBE CONNECTOR pass through the photo couplers on this board, and are sent to MAIN CONTROL board.


PROBE 1
PROBE 2
120
TX/RX 1~120
120
TX/RX 1~120
SELECTOR (RELAYS)
EP-3453-5
EP-3453-4
EP-3453-3
EP-3453-2
EP-3453-1
×24
EP-3453-5
EP-3453-4
EP-3453-3
EP-3453-2
EP-3453-1
×24
120
Tx 1~120
Rx 1~120
PHOTO COUPLER
PRB 1/2
PS 1
PHOTO COUPLER
L ON/OFF
RELAY
L̄, L (for PROBE 1)
L̄, L (for PROBE 2)
PC 11~18
(from PROBE 1)
PHOTO COUPLER
PCD 101~108
(to MAIN CONTROL)
PC 21~28
(from PROBE 2)
PHOTO COUPLER
PCD 201~208
(to MAIN CONTROL)
PC 31~33
(from IND PROBE)
PHOTO COUPLER
PCD 301~303
(to MAIN CONTROL)

EP-3453-1~5各2枚づつ合計10枚のPCBはEP-3454にコネクタで接続されています。
10 PCBs, EP-3453-1~5 ×2, are mounted on one EP-3454 by the connectors.

Aloka	TITLE 名称	MODEL 形名	1/1
	PROBE SELECTOR	EP-3454	

16-3 EP-3455 RX SELECT

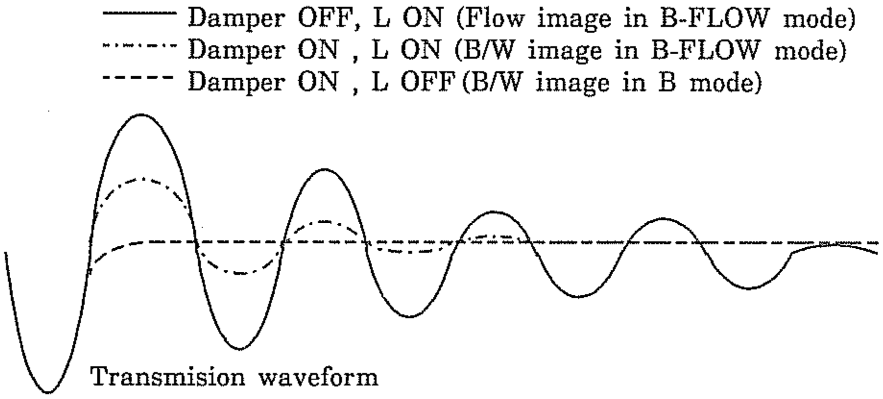
1. General

This PCB consists of the DAMPER circuit, the SELECTOR circuit for selecting 48 of 120 transducers total, and the SELECTOR CONTROL circuit.

2. Operation

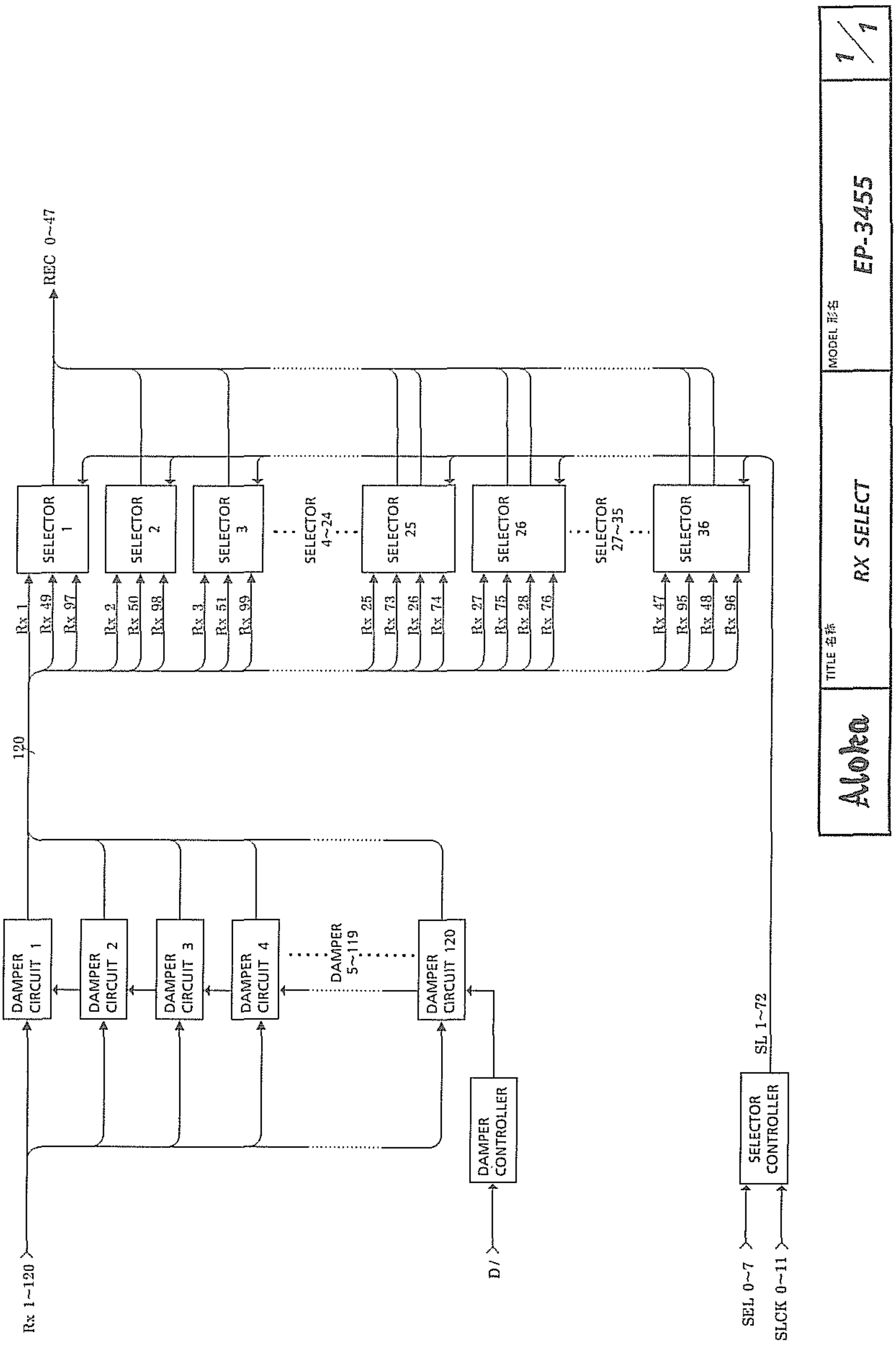
1) DAMPER circuit

Damper ON : Increases the resolution in the direction of distance in B mode.
Damper OFF : Increases the sensitivity in Doppler, flow mode.



2) SELECTOR, SELECTOR CONT circuit

This circuit is used for selecting 48 of 120 elements which are based on SEL 0~7, SCLK 0~11 from the Rx SELECT CONT.


Rx 1~120
DAMPER CIRCUIT 1
DAMPER CIRCUIT 2
DAMPER CIRCUIT 3
DAMPER CIRCUIT 4
DAMPER 5~119
DAMPER CIRCUIT 120
DAMPER CONTROLLER
D/
120
Rx 1
Rx 49
Rx 97
Rx 2
Rx 50
Rx 98
Rx 3
Rx 51
Rx 99
Rx 25
Rx 73
Rx 26
Rx 74
Rx 27
Rx 75
Rx 28
Rx 76
Rx 47
Rx 95
Rx 48
Rx 96
SELECTOR 1
SELECTOR 2
SELECTOR 3
SELECTOR 4~24
SELECTOR 25
SELECTOR 26
SELECTOR 27~35
SELECTOR 36
REC 0~47
SELECTOR CONTROLLER
SL 1~72
SEL 0~7
SLCK 0~11
Aloka
TITLE 名称
RX SELECT
MODEL 形名
EP-3455
1/1

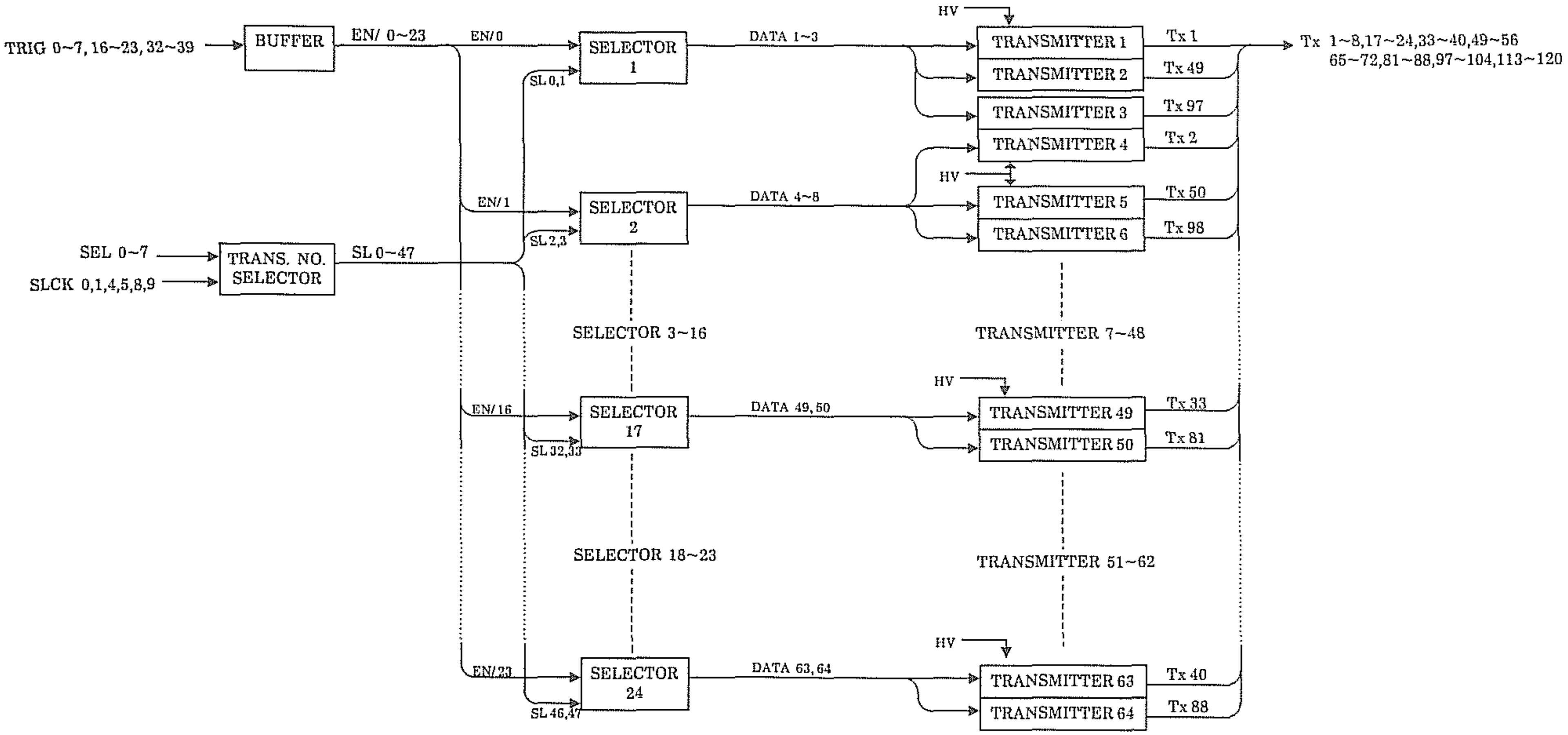
16-4 EP-3456 TX1

1. General

   One set of two PCBs, EP-3456(TX1) and EP-3457(TX2), consists of 120 transmission pulse generators for oscillating transducers.
   EP-3456(TX1) has 64 transmitters.

2. Operation

   TRIG 0~47 from the Tx TRIGGER GENE are sent to the TRANSMITTER which is set by SEL 0~7 and SCLK 0~11 sent from the Rx SELECT CONT, to generate pulses for oscillating the transducer.


TRIG 0~7, 16~23, 32~39
BUFFER
EN/ 0~23
EN/0
SELECTOR 1
SL 0,1
DATA 1~3
HV
TRANSMITTER 1
TRANSMITTER 2
TRANSMITTER 3
TRANSMITTER 4
Tx 1
Tx 49
Tx 97
Tx 2
Tx 1~8,17~24,33~40,49~56
65~72,81~88,97~104,113~120
EN/1
SELECTOR 2
SL 2,3
DATA 4~8
HV
TRANSMITTER 5
TRANSMITTER 6
Tx 50
Tx 98
SEL 0~7
SLCK 0,1,4,5,8,9
TRANS. NO. SELECTOR
SL 0~47
SELECTOR 3~16
TRANSMITTER 7~48
EN/16
SELECTOR 17
SL 32,33
DATA 49, 50
HV
TRANSMITTER 49
TRANSMITTER 50
Tx 33
Tx 81
SELECTOR 18~23
TRANSMITTER 51~62
EN/23
SELECTOR 24
SL 46,47
DATA 63, 64
HV
TRANSMITTER 63
TRANSMITTER 64
Tx 40
Tx 88

Aloka	TITLE 名称 TX 1	MODEL 形名 EP-3456	1/1

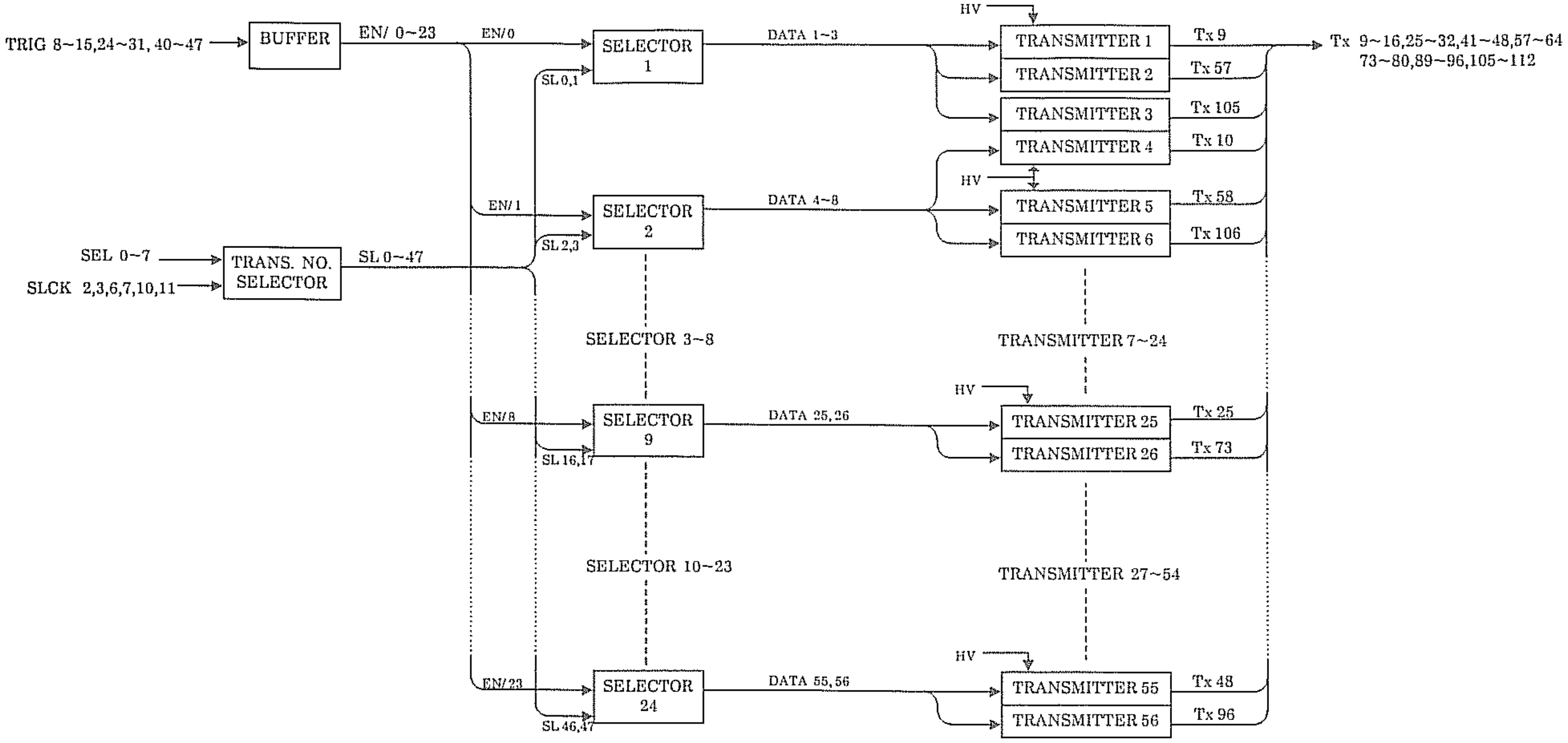
16-5 EP-3457 TX 2

1. General

One set of two PCBs, EP-3456(TX1) and EP-3457(TX2), consists of 120 transmission pulse generators for oscillating transducers.
EP-3457(TX2) has 56 transmitters.

2. Operation

TRIG 0~47 from the Tx TRIGGER GENE are sent to the TRANSMITTER which is set by SEL 0~7 and SCLK 0~11 sent from the Rx SELECT CONT, to generate pulses for oscillating the transducer.


TRIG 8~15,24~31, 40~47
BUFFER
EN/ 0~23
EN/0
SELECTOR 1
SL 0,1
DATA 1~3
HV
TRANSMITTER 1
TRANSMITTER 2
TRANSMITTER 3
TRANSMITTER 4
Tx 9
Tx 57
Tx 105
Tx 10
Tx 9~16,25~32,41~48,57~64
73~80,89~96,105~112
EN/1
SELECTOR 2
SL 2,3
DATA 4~8
HV
TRANSMITTER 5
TRANSMITTER 6
Tx 58
Tx 106
SEL 0~7
SLCK 2,3,6,7,10,11
TRANS. NO. SELECTOR
SL 0~47
SELECTOR 3~8
TRANSMITTER 7~24
EN/8
SELECTOR 9
SL 16,17
DATA 25, 26
HV
TRANSMITTER 25
TRANSMITTER 26
Tx 25
Tx 73
SELECTOR 10~23
TRANSMITTER 27~54
EN/23
SELECTOR 24
SL 46,47
DATA 55, 56
HV
TRANSMITTER 55
TRANSMITTER 56
Tx 48
Tx 96

Aloka	TITLE 名称 TX 2	MODEL 形名 EP-3457	1/1

16-6 EP-3458 Pre AMP

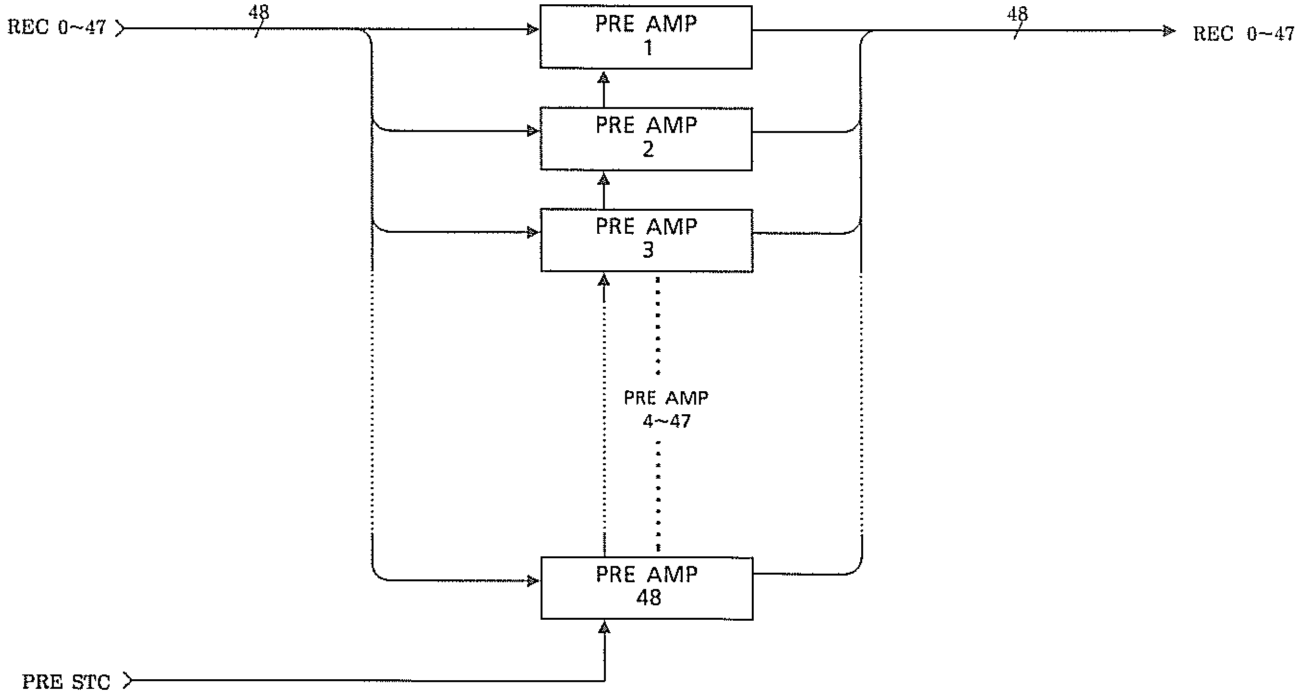
1. General

   It consists of 48 Pre Amp circuits.

2. Operation

   Receive signal from the Rx SELECTOR is amplified by 20 dB in this PCB. Since strength of echo signal is weak as distance increases, the Pre STC controls the amplification rate of AMP so that it increases as distance increases.

   (In Color and Doppler mode, however, the Pre STC is not used to avoid decreasing sensitivity.)


REC 0~47
48
PRE AMP 1
PRE AMP 2
PRE AMP 3
PRE AMP 4~47
PRE AMP 48
PRE STC
48
REC 0~47

Aloka	TITLE 名称 Pre AMP	MODEL 形名 EP-3458	1/1

16-7 EP-3459 RX FOCUS

1. General

   Two PCBs used for dynamic focus of received signal consist of five blocks, namely,
   1) IN-VI-BUFFER, 2) MATRIX SWITCH and MATRIX SWITCH CONTROLLER,
   3) DELAY-LINE, 4) VARIABLE BAND PASS FILTER, and 5) TRANSFORMER.

2. Operation

   1) IN-VI-BUFFER block

      Converts voltage of received echos (REC 0 to 47) into the respective current which flows through the MATRIX SWITCH to the DELAY LINE.

   2) MATRIX SWITCH and MATRIX SWITCH CONTROLLER block

      48-line signals receive from the IN-VI-BUFFER block need respective proper delays to get Rx FOCUS effects. The MATRIX SWITCH selects a proper terminal of DELAY LINE for each of received signals so that the optimum delay is given to each signal.

      The MATRIX SWITCH is a CROSS POINT SWITCH board in which 48 input signals are switched to 48 output signals. The board has a built-in CONTROL MEMORY circuit which controls the desired switching actions of the input and output cross points. So, 48 input signals are outputted to the DELAY LINE through the desired output terminals.

      It is possible to take out only the necessary signals by controlling the MATRIX SWITCH operation so that unnecessary signal input terminals are selectively kept OPEN. This control operation is needed for variable-aperture receiving.

      By eight times repetitions of this write-in cycle up to No.8, to which output line are connected sixteen input lines is set in the elements.

   3) DELAY LINE

      Consists of the DELAY LINE (DL1 to DL10), INTERSTAGE BUFFER (DL11 to DL14), and BUFFER.

      The DELAY LINE give the signal delay of 25 ns per tap and 2.0 μs in total of 10 delay lines, making correction of signal phase possible. Each LINE of 48 signals received can be connected to one of 48 taps of DELAY LINE. Current addition output is converted by the BUFFER into voltage which is sent to V.B.P.F.

   4) VARIABLE BAND PASS FILTER

      The V.B.P.F. is a synchronizing FILTER having the series resonance part and parallel resonance part. By scanning the For CONT signal voltage from high voltage to low voltage during time corresponding to one line of supersound, the capacity of the variable capacitor diode is controlled so that pass band characteristic is varied from high frequency to low frequency continuously. SCAN width of the pass band deperds on frequency of the probe used.

   5) TRANSFORMER

      Output signal from the V.B.P.F. is sent to the TRANSFORMER for equilibrium conversion. Then, video output signal from two boards of Rx FOCUS PCB is switched over by the Rx ECHO, 1 and sent to the MAIN AMP PCB.

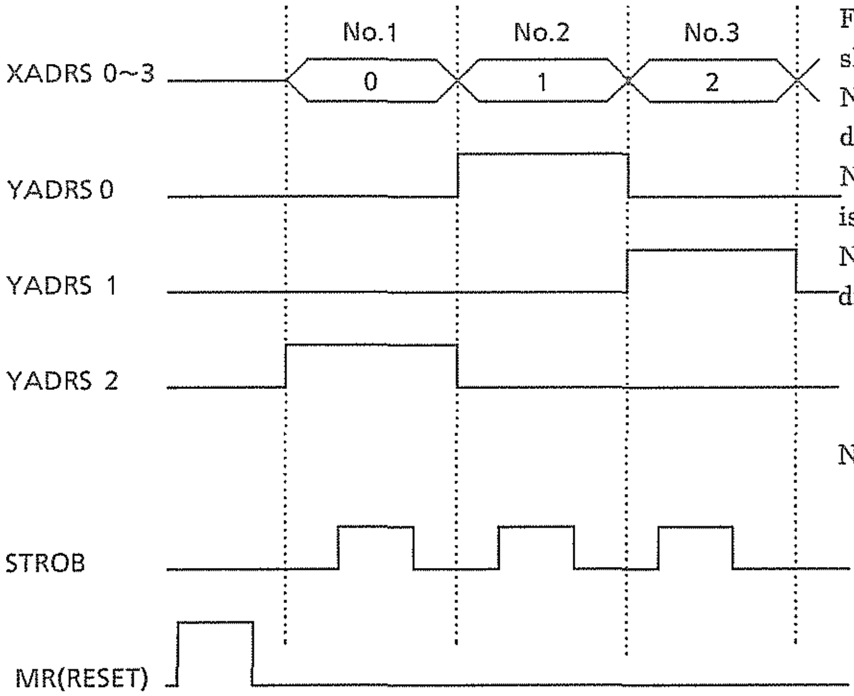
≪MATRIX SWITCH CONTROLLER≫

This circuit outputs the CONTROL signal which changes over the MATRIX SWITCH to give 48 lines of echos received the different levels of delay, respectively.

≪MATRIX SWITCH MT8816 AP≫

The element having 16×8 MATRIX SWITCHES and CONTROL MEMORY is used for 16 input signals and 8 output signals in this PCB. Five kinds of control signals (MR, STROB, DATA, XADRS 0-3, and YADRS 0-2) are used to control the CONTROL MEMORY in this element.

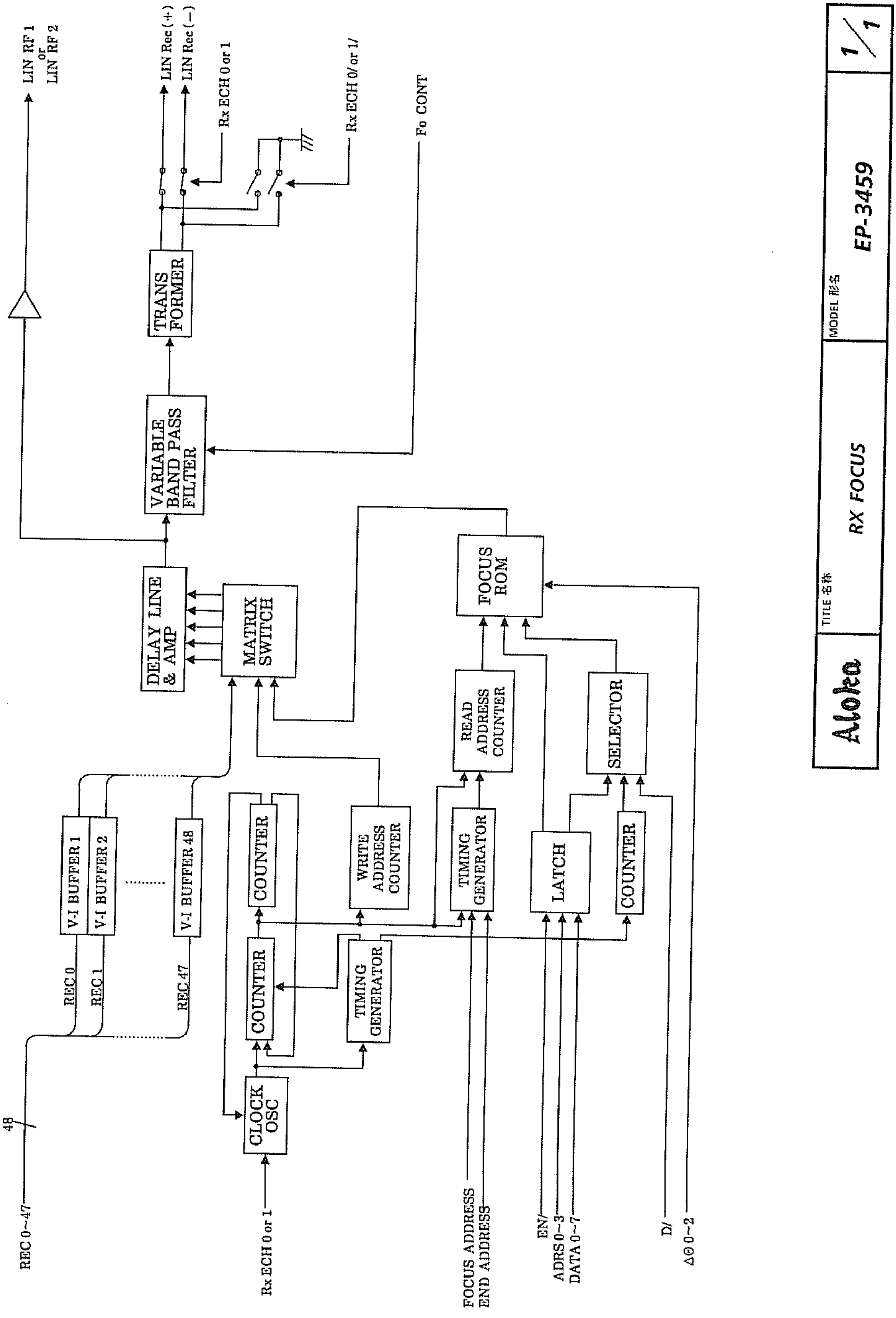
- MR : Resets the CONTROL MEMORY (All OFF).
- YADRS 0~2 : Selects one of eight output lines.
- XADRS 0~3 : Selects one of 16 input lines.
- STROB : Latches ADDRESS in MATRIX SWITCH
- DATA : Turns the selected SWITCH on or off.



For example, in the case shown in the figure at left:
No.1 means that input "0" is directed to output "4".
No.2 means that input "1" is directed to output "1".
No.3 means that input "2" is directed to output "2".

.
.
.

No.8


LIN RF 1 or LIN RF 2
LIN Rec (+)
LIN Rec (−)
Rx ECH 0 or 1
Rx ECH 0/ or 1/
Fo CONT
TRANS FORMER
VARIABLE BAND PASS FILTER
DELAY LINE & AMP
MATRIX SWITCH
FOCUS ROM
READ ADDRESS COUNTER
SELECTOR
V-I BUFFER 1
V-I BUFFER 2
V-I BUFFER 48
COUNTER
WRITE ADDRESS COUNTER
TIMING GENERATOR
LATCH
COUNTER
COUNTER
TIMING GENERATOR
CLOCK OSC
REC 0
REC 1
REC 47
48
REC 0~47
Rx ECH 0 or 1
FOCUS ADDRESS
END ADDRESS
EN/
ADRS 0~3
DATA 0~7
D/
ΔΘ 0~2
Aloka
TITLE 名称
RX FOCUS
MODEL 形名
EP-3459
1/1

16-8 EP-3461 MAIN AMP & COLOR ITF

1. General

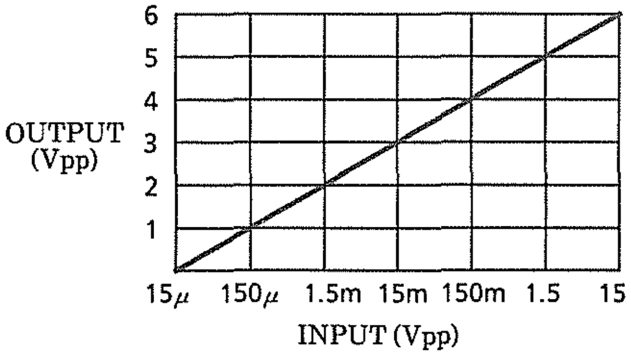
This PCB has the function of processing the signals received from the VBPF in the RX FOCUS (EP-3459) before sending the signals to the DSC, the function of selecting either color or PW doppler signal, and the COLOR ITF circuit converting the received signal into the signal which COLOR FLOW PROCESSOR board (EP-5100) needs.

2. Operation

1) LOG AMP

LINREC (−), (+) output from the V.B.P.F. of the Rx FOCUS unit is input through the TRANSFORMER to the LOG AMP, which outputs the LOG compressed signal. The LOG AMP consists of two sets of IF AMP (+ 30dB) AND BUFFER ATTENUATOR

(−30dB) and of the LOGALITHMIC AMPLIFIER. Total dynamic range is 120 dB. Input/output characteristic is shown below.



2) DETECTOR

Output signal from the LOG AMP is 22dB amplified by the DIFFERENTIAL AMP and then detected by the DETECTOR.

3) GAIN CONT ADDER

Output signal from the DETECTOR is GAIN-controlled by the ADDER. The level of GAIN is dependent on the level of input GAIN CONT signal from the GAIN CONTROL. The scale factor is 20 dB/V.

4) PRE-PROCESSOR

This circuit for processing the received echo signals has the AGC, RELIEF, FTC, and CONTRAST functions.

5) VIDEO AMP

After processing in the PRE-PROCESSOR, received echo signals are amplifies by the INVERTING AMPLIFIER and then sent to the DSC through the BUFFER.

6) DOPPLER SIGNAL SELECTOR

Doppler RF signal from EP-3459 is switched to either the RF signal for B mode (color) or the RF signal for D mode (PW). The RF signal switched to D mode is switched with the RF signal of IND probe to select either one which is to be sent to the doppler unit through the equilibrium circuit.

7) COLOR ITF

① BAND PASS FILTER circuit

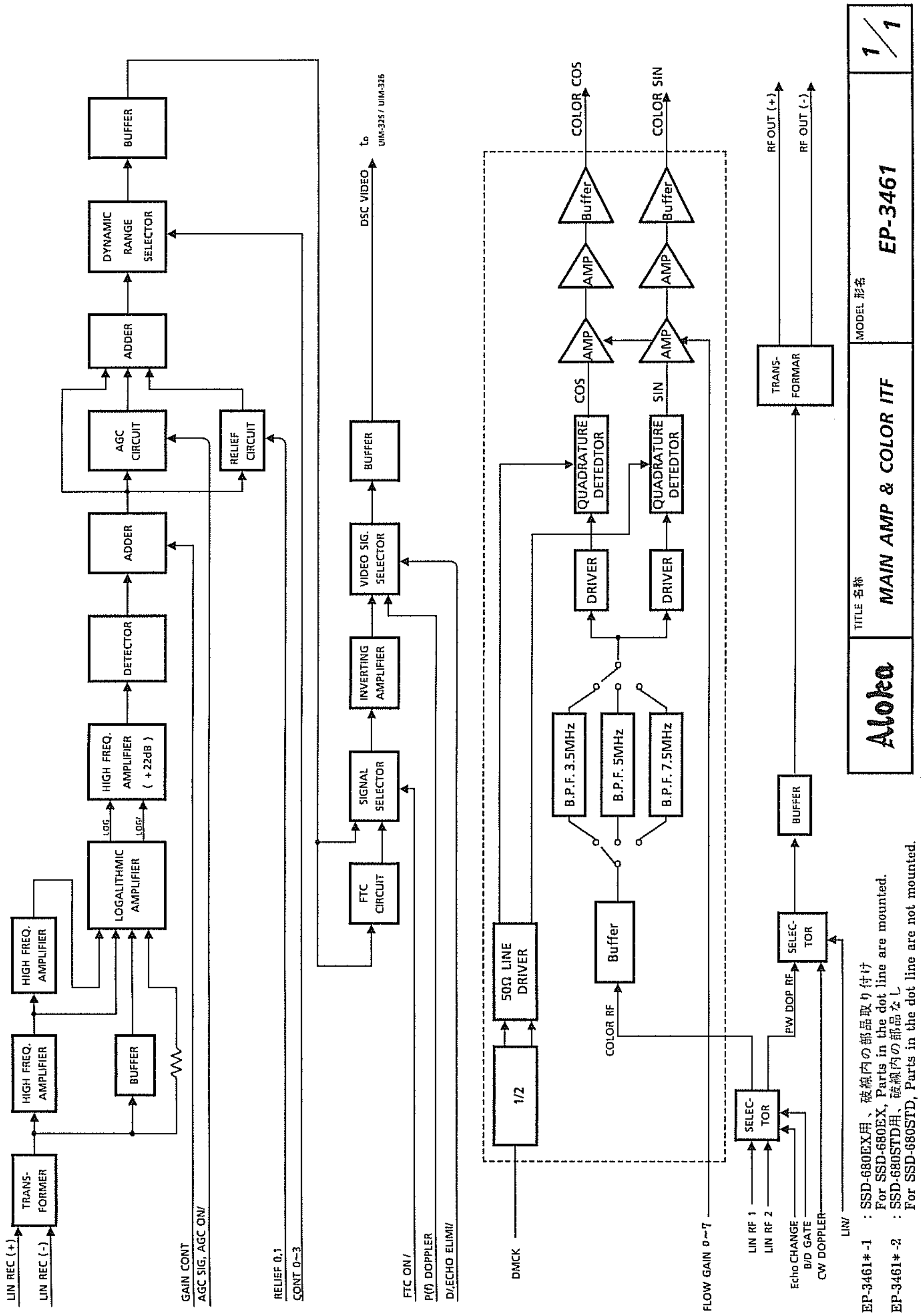
The 30 dB/oct band pass filter is for a frequency of "center frequency for each probe" ±1 MHz, which allows only the signal needed for color information to pass through it. Three kinds of Band Pass Filter (3.5 MHz, 5 MHz, and 7 MHz filters) are available.

② QUADRATURE DETECTOR circuit

Received signal passed through Band Pass Filter is quadrature-detected to get COLOR SIN and COS signals, using two-line signals - CARRIER SIN and COS - which differ 90 °C in phase from each other with reference to the clock of probe center frequency (3.5 MHz, 5 MHz, or 7 MHz) by DMCK.

③ AMP circuit

Amplifies the detected two-line signals to a level necessary for sending those signals to EP-5100.


LIN REC (+)
LIN REC (-)
TRANS-FORMER
HIGH FREQ. AMPLIFIER
HIGH FREQ. AMPLIFIER
BUFFER
LOGALITHMIC AMPLIFIER
LOG
LOG/
HIGH FREQ. AMPLIFIER (+22dB)
DETECTOR
ADDER
AGC CIRCUIT
RELIEF CIRCUIT
ADDER
DYNAMIC RANGE SELECTOR
BUFFER
GAIN CONT
AGC SIG, AGC ON/
RELIEF 0,1
CONT 0~3
FTC CIRCUIT
SIGNAL SELECTOR
INVERTING AMPLIFIER
VIDEO SIG. SELECTOR
BUFFER
DSC VIDEO
to UIM-325 / UIM-326
FTC ON/
P(f) DOPPLER
D/ECHO ELIMI/
DMCK
1/2
50Ω LINE DRIVER
Buffer
B.P.F. 3.5MHz
B.P.F. 5MHz
B.P.F. 7.5MHz
DRIVER
DRIVER
QUADRATURE DETEDTOR
QUADRATURE DETEDTOR
COS
SIN
AMP
AMP
AMP
AMP
Buffer
Buffer
COLOR COS
COLOR SIN
COLOR RF
FLOW GAIN 0~7
LIN RF 1
LIN RF 2
Echo CHANGE
B/D GATE
CW DOPPLER
SELEC-TOR
PW DOP RF
SELEC-TOR
LIN/
BUFFER
TRANS-FORMAR
RF OUT (+)
RF OUT (-)
Aloka
TITLE 名称
MAIN AMP & COLOR ITF
MODEL 形名
EP-3461
1/1

EP-3461＊-1 : SSD-680EX用、破線内の部品取り付け
For SSD-680EX, Parts in the dot line are mounted.
EP-3461＊-2 : SSD-680STD用、破線内の部品なし
For SSD-680STD, Parts in the dot line are not mounted.

16-9 EP-3463 VBPF & GAIN CONTROL

1. General

   This PCB consists of the F0 CONT signal generating circuit, PRE STC signal generating circuit, STC signal generating circuit, GAIN signal generating circuit, Flow Gain CONT circuit, Rx Echo change signal generating circuit, and data-from-MAIN-CONTROL latching circuit.

2. Operation

   1) F0 CONT signal generating circuit

      Generates "F0 CONT" signal used for controlling the Variable Band Pass Filter.

   2) PRE STC signal generating circuit

      Generates the PRE STC signal used for suppressing the close-distance echo signal level which is sent to the PRE AMP in the Pre AMP board.

   3) STC signal generating circuit

      Generates the STC signal corresponding to setting of the STC volume on the panel.

   4) GAIN signal generating circuit

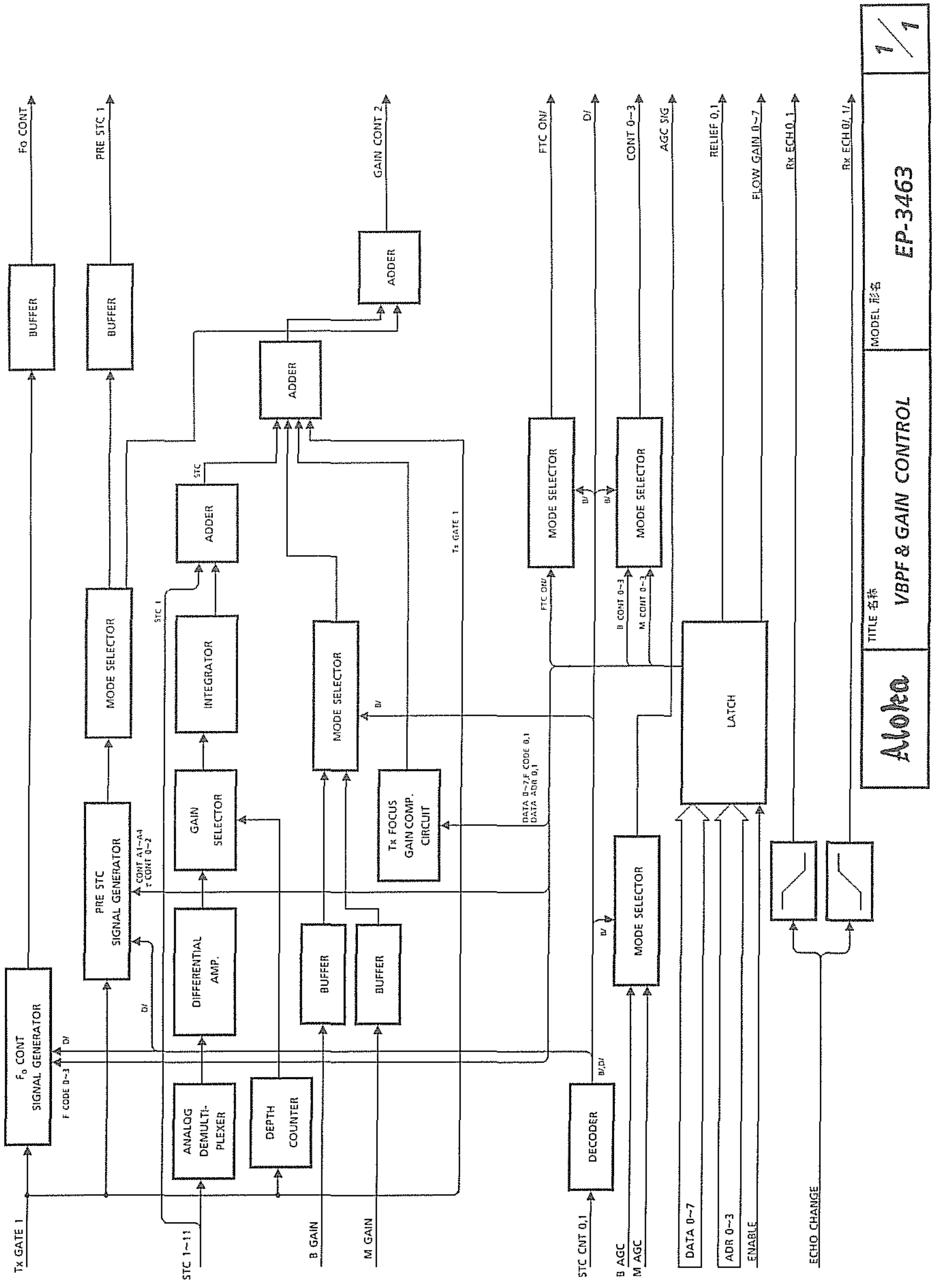
      Switches over the B-GAIN signal and M-GAIN signal to each other in conformity with the selected mode. This GAIN signal, the above-mentioned STC signal and PRE STC signal, and the GAIN correction signal at the time of dynamic focus sum up to "GAIN CONT 2" which is outputted to the "MAIN AMP & COLOR ITF" PCB.

   5) Data-from-MAIN-CONTROL latching circuit

      Receives data from the MAIN CONTROL through the "GEU INTERFACE" PCB and sets up the condition in this PCB. Data such as "FTC ON/", "CONT 0-3", and "RELIEF 0, 1" are temporarily latched in this PCB before they are outputted to the "MAIN AMP & COLOR ITF" PCB.

   6) Rx ECHO CHANGE signal generating circuit

      This circuit outputs the control signals Rx ECH 0, 1 to alternately exchange “the setting of delay time” and ”the reception operation” in two systems of RX FOCUS boards (EP-3459).


Tx GATE 1
STC 1~11
B GAIN
M GAIN
STC CNT 0,1
B AGC
M AGC
DATA 0~7
ADR 0~3
ENABLE
ECHO CHANGE
Fo CONT
PRE STC 1
GAIN CONT 2
FTC ON/
D/
CONT 0~3
AGC SIG
RELIEF 0,1
FLOW GAIN 0~7
Rx ECH 0,1
Rx ECH 0/,1/
F₀ CONT SIGNAL GENERATOR
F CODE 0~3
D/
BUFFER
BUFFER
PRE STC SIGNAL GENERATOR
CONT A1~A4
τ CONT 0~2
MODE SELECTOR
ANALOG DEMULTI-PLEXER
DIFFERENTIAL AMP.
GAIN SELECTOR
INTEGRATOR
ADDER
STC 1
STC
DEPTH COUNTER
BUFFER
BUFFER
MODE SELECTOR
B/
Tx FOCUS GAIN COMP. CIRCUIT
DATA 0~7,F CODE 0,1
DATA ADR 0,1
ADDER
ADDER
Tx GATE 1
DECODER
B/,D/
MODE SELECTOR
B/
MODE SELECTOR
FTC ON/
MODE SELECTOR
B CONT 0~3
M CONT 0~3
LATCH
Aloka
TITLE 名称
VBPF & GAIN CONTROL
MODEL 形名
EP-3463
1/1

16-10 EP-3464 TX TRIGGER GENE

1. General

This PCB has the circuit necessary for generating transmission triggers TRIG 0 to 47. Transmission delay time which electronic FOCUS needs in also generated by this PCB.

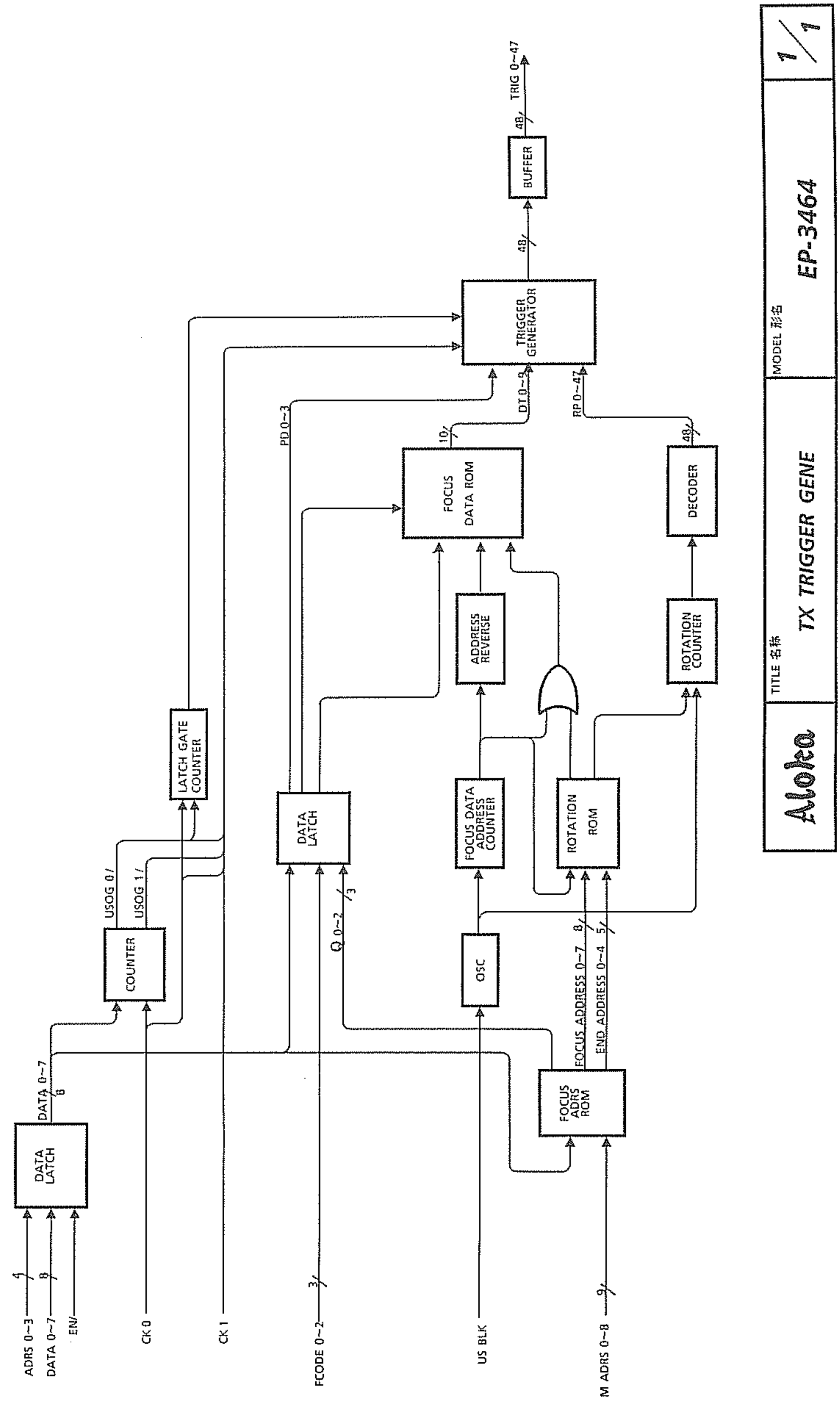
2. Operation

1) FOCUS DATA ROM

This ROM determines delay time of transmission triggers to be applied to 48 transmission circuits. Output data (DT 0 to 9) of this ROM are ratched in the trigger generator by signal ENA and signals ADRS 0 to 3.

2) TRIGGER GENERATOR

This circuit compares information from the FOCUS DATA ROM with CK 0, 1 count output and, when the two are equal, outputs a pulse as the transmitter triger.

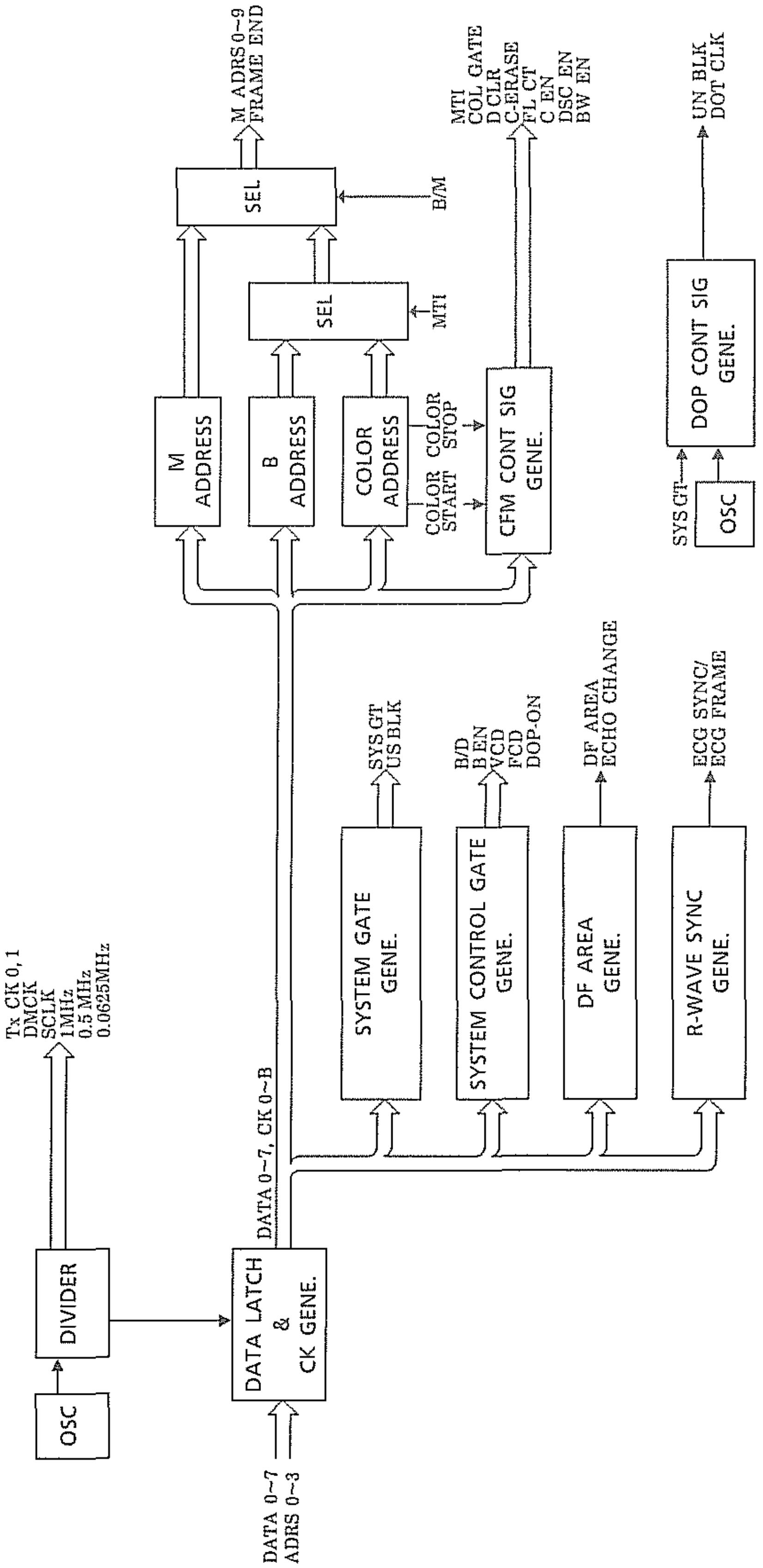

ADRS 0~3
DATA 0~7
EN/
4
8
DATA LATCH
DATA 0~7
8
COUNTER
USOG 0/
USOG 1/
LATCH GATE COUNTER
CK 0
CK 1
FCODE 0~2
3
DATA LATCH
Q 0~2
3
PD 0~3
FOCUS DATA ROM
10
DT 0~9
ADDRESS REVERSE
FOCUS DATA ADDRESS COUNTER
ROTATION ROM
ROTATION COUNTER
DECODER
48
RP 0~47
TRIGGER GENERATOR
48
BUFFER
48
TRIG 0~47
US BLK
OSC
FOCUS ADRS ROM
FOCUS ADDRESS 0~7
8
END ADDRESS 0~4
5
M ADRS 0~8
9
Aloka
TITLE 名称
TX TRIGGER GENE
MODEL 形名
EP-3464
1/1

16-11 EP-3465 GEU TIMING & ADDRESS

1. General

This PCB consists of the timing signal generating part and the address generating part.

2. Operation
   1) Timing signal generating part
      - SYSTEM GATE GENE.
        Signals generated here are SYSGT, USBLK and DOPRATE which are the basis of equipment operation.
        - SYSTEM CONT GATE GENE.
          Signals generated here on the basis of SYSGT control the movement of various parts of equipment.
        - DFAREA GENE.
          The DF AREA signal and ECHO CHANGE signal are generated here.
        - DOP CONT SIG GENE.
          The DOTCLK and UNBLK signals are generated here.
        - CFM CONT SIG GENE.
          Signals generated here control the operation of various parts of equipment in color mode.
        - R-WAVE SYNC GENE.
          Generates the R-wave synchronizing signal when ECG signal display unit is connected.
   2) Address generating part
      Signals M ADDRESS, B ADDRESS, and COLOR ADDRESS are generated here and sent to various parts.

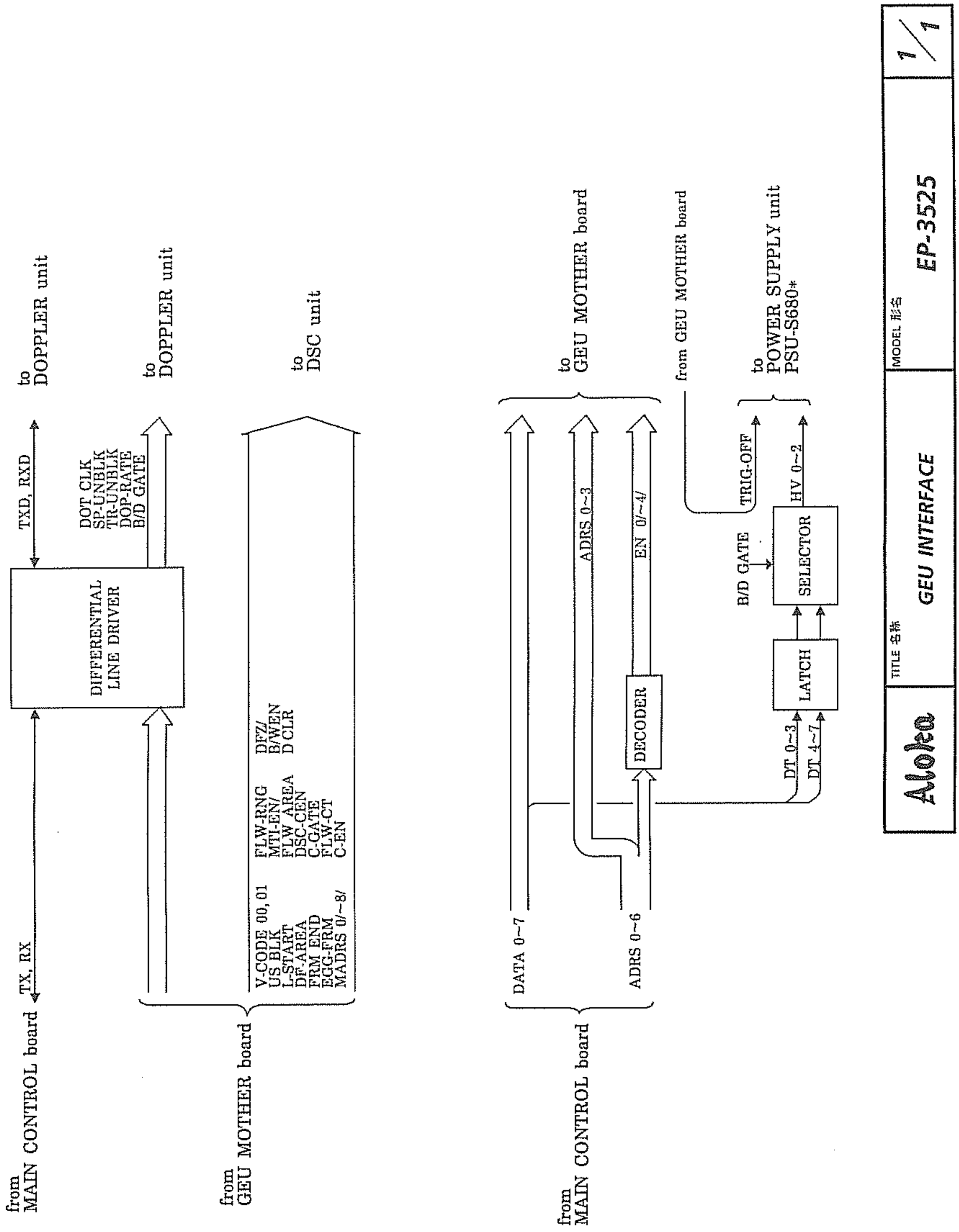

OSC
DIVIDER
Tx CK 0, 1
DMCK
SCLK
1MHz
0.5 MHz
0.0625MHz
DATA 0~7
ADRS 0~3
DATA LATCH & CK GENE.
DATA 0~7, CK 0~B
SYSTEM GATE GENE.
SYS GT
US BLK
SYSTEM CONTROL GATE GENE.
B/D
B EN
VCD
FCD
DOP-ON
DF AREA GENE.
DF AREA
ECHO CHANGE
R-WAVE SYNC GENE.
ECG SYNC/
ECG FRAME
M ADDRESS
B ADDRESS
COLOR ADDRESS
COLOR START
COLOR STOP
CFM CONT SIG GENE.
SEL
MTI
SEL
B/M
M ADRS 0~9
FRAME END
MTI
COL GATE
D CLR
C-ERASE
FL CT
C EN
DSC EN
BW EN
SYS GT
OSC
DOP CONT SIG GENE.
UN BLK
DOT CLK

Aloka
TITLE 名称 GEU TIMING & ADDRESS
MODEL 形名 EP-3465
1/1

16-12 EP-3525 GEU INTERFACE

1) Through this PCB, the timing signal, control signal, and address, generated by the GEU TIMING & ADDRESS (EP-3465) in the GEU, are sent to the DSC and DOP.

2) Through this PCB, register data from the MAIN CONTROL (EP-3265) is sent to the GEU. Also, the HV control signal is sent to the power supply unit (PSU-S680) from this PCB.


from MAIN CONTROL board
TX, RX
DIFFERENTIAL LINE DRIVER
TXD, RXD
to DOPPLER unit
DOT CLK
SP-UNBLK
TR-UNBLK
DOP-RATE
B/D GATE
to DOPPLER unit
from GEU MOTHER board
V-CODE 00, 01
US BLK
L-START
DF-AREA
FRM END
EGG-FRM
MADRS 0/~8/
FLW-RNG
MTI-EN/
FLW AREA
DSC-CEN
C-GATE
FLW-CT
C-EN
DFZ/
B/WEN
D CLR
to DSC unit
from MAIN CONTROL board
DATA 0~7
ADRS 0~6
DECODER
ADRS 0~3
EN 0/~4/
to GEU MOTHER board
from GEU MOTHER board
DT 0~3
DT 4~7
LATCH
SELECTOR
B/D GATE
TRIG-OFF
HV 0~2
to POWER SUPPLY unit PSU-S680*
Aloka
TITLE 名称
GEU INTERFACE
MODEL 形名
EP-3525
1/1

16-13 EP-3452 RX SELECT CONT

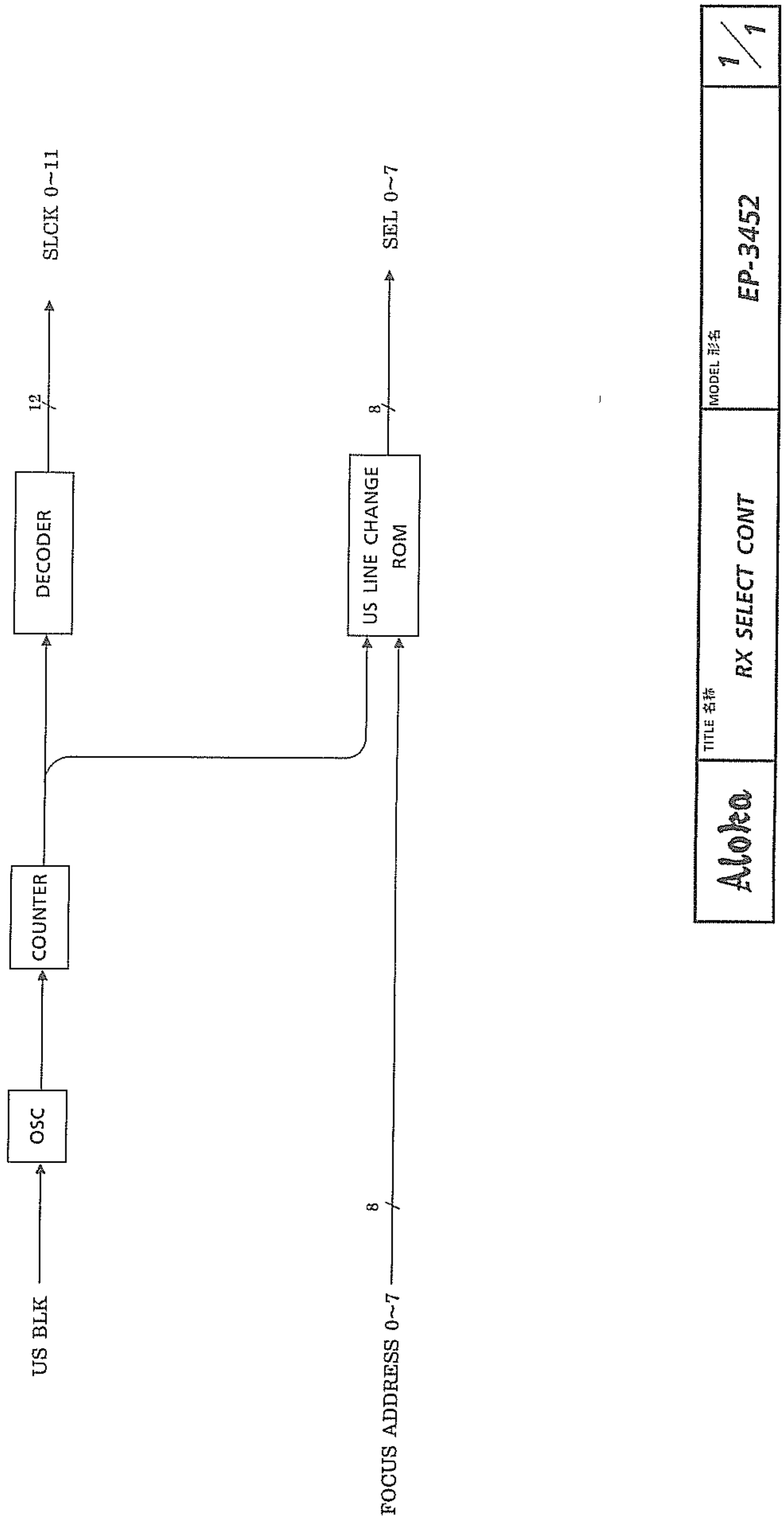
1. General

   This control circuit is used for selecting a transducer number.

2. Operation

   On the basis of FOCUS ADDRESS data, it determines which transducers to be selected (normally 48 blocks) during BLK time of US BLK signal.

   This SELECT signal is sent to Rx SELECT (EP-3455) and TX1, TX2 (EP-3456, EP-3457).


US BLK
OSC
COUNTER
DECODER
12
SLCK 0~11
FOCUS ADDRESS 0~7
8
US LINE CHANGE ROM
8
SEL 0~7
Aloka
TITLE 名称
RX SELECT CONT
MODEL 形名
EP-3452
1/1

16-14 EP-3247 B/W MEMORY

1. General

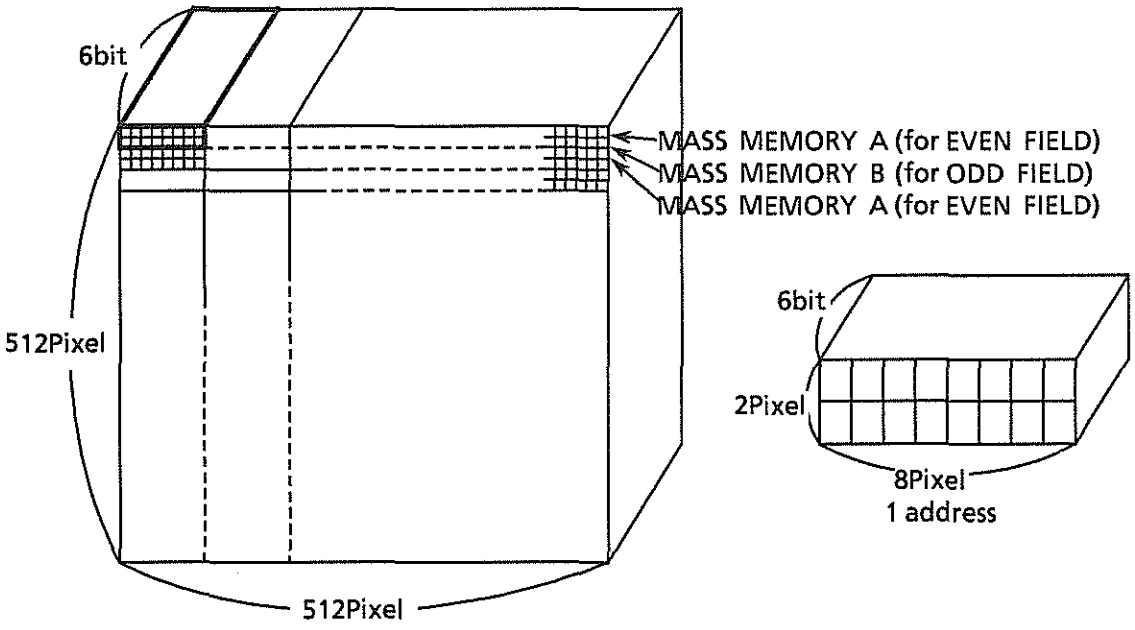
This PCB includes the mass memory for B/W having a capacity large enough to cover the whole area of ultrasound tomography image (512 pixels × 512 pixels × 6 bits). The PCB also includes the update ROM for frame correlation use.

2. Operation

1) MASS MEMORY

The mass memory consists of 32 chips of D-RAM ICs. The half of them (16 chips) have charge of 4 bits (0-3) and the remainder (16 chips) have charge of 2 bits (4 and 5) among 16 bits for gray-scale stages. (The remainder having charge of 2 bits is not in use.)

The arrangement of the memory is shown in the following Fig. Eight chips are arranged in the horizontal-scanning direction and two chips are in the vertical direction, so that total 16 pixels are included in one address.


6bit
MASS MEMORY A (for EVEN FIELD)
MASS MEMORY B (for ODD FIELD)
MASS MEMORY A (for EVEN FIELD)
512Pixel
512Pixel
6bit
2Pixel
8Pixel
1 address

Memory Capacity

Therefore, the whole tomography image is composed of 64 addresses in the horizontal direction and 256 addresses in the vertical direction.

① Writing in to memory (READ MODIFY WRITE)

To perform frame correlation, the mass memory operates in the RMW (Read Modify Write) cycle. To increase writing speed, access to two pixels in the same address is made simultaneously and writing of those two pixels is also made simultaneously.

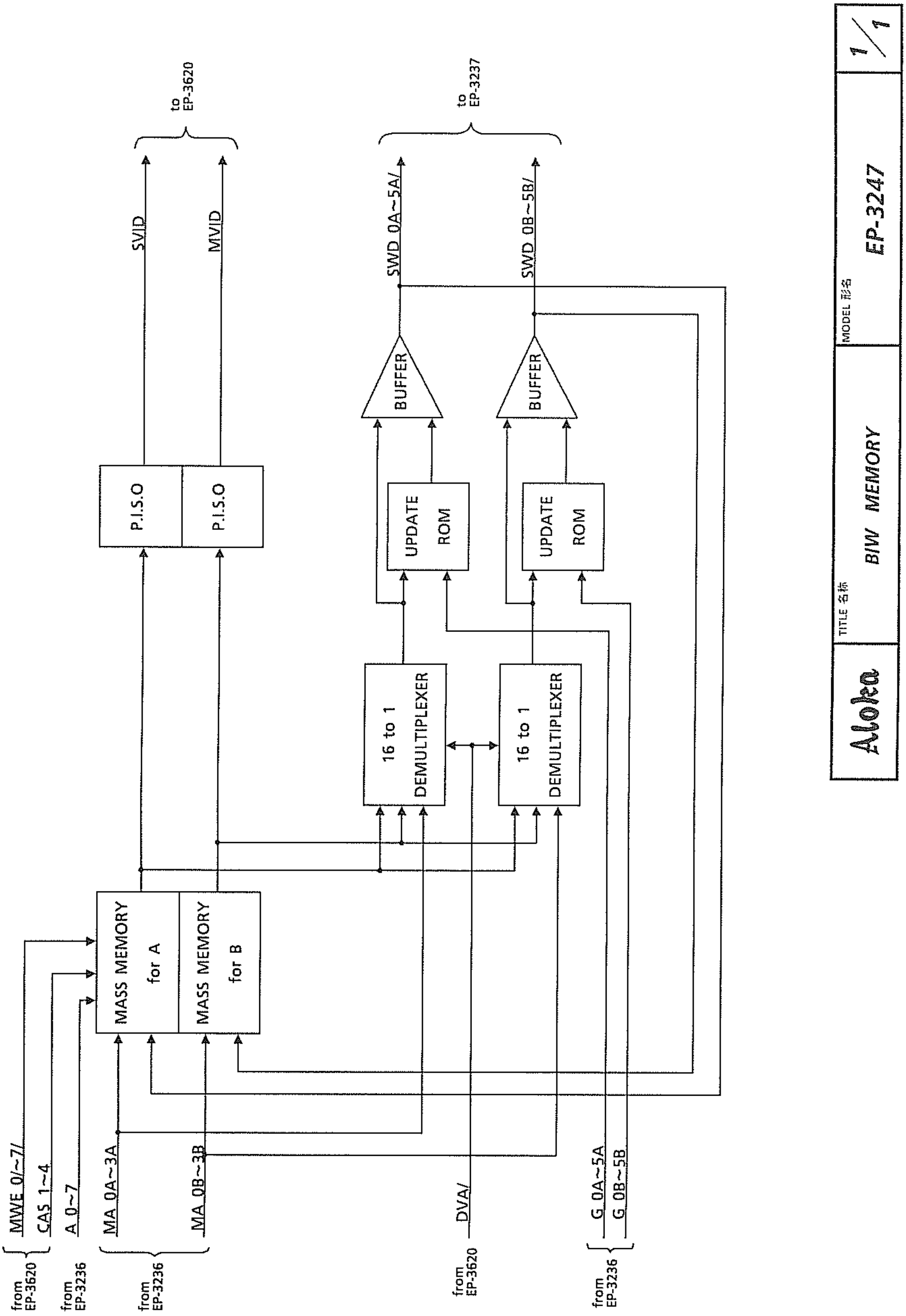
② Reading out from memory (PARALLEL READ)

To display data on the TV monitor, 16-pixel data (one pixel on each RAM chip) are read out from 16 RAM chips simultaneously for one address use.

The READ MODIFY WRITE cycle and the PARALLEL READ cycle are repeated alternately.

2) UPDATE ROM

The update ROM is for the purpose of getting correlation of data read out from the LINE BUFFER (new dat: G0A-G5A, G0B-G5B) with the old data on the same memory address (SRD0A-SBD5A, SBD0B-SBD5B), and is used in the time of frame correlation. The correlated data become the new data to be written in the memory. When there is no necessity of correlation (M-mode, etc.), new data are sent to the memory directly through the route bypassing the update ROM.


Aloka
TITLE 名称
B/W MEMORY
MODEL 形名
EP-3247
1/1
MWE 0/~7/
CAS 1~4
from EP-3620
A 0~7
from EP-3236
MA 0A~3A
MA 0B~3B
from EP-3236
DVA/
from EP-3620
G 0A~5A
G 0B~5B
from EP-3236
MASS MEMORY for A
MASS MEMORY for B
P.I.S.O
P.I.S.O
SVID
MVID
to EP-3620
16 to 1 DEMULTIPLEXER
16 to 1 DEMULTIPLEXER
UPDATE ROM
UPDATE ROM
BUFFER
BUFFER
SWD 0A~5A/
SWD 0B~5B/
to EP-3237

16-15 EP-3236 DSC ADDRESS

1. General

This PCB consists of the address generator circuit for writing in memory, address generator circuit for reading out of memory, address generator circuit for MPU Access, plane control circuit, off screen control circuit, X-Y calculator, LINE BUFFER, and MEMORY WRITE CONTROL.

2. Operation

1) Address Generator Circuits

A. WRITE ADDRESS

The address counter circuit for writing in memory generates X-, Y-direction addresses by means of the X-address counter and Y-address counter to use them as A0/~7/ to be sent to the "MEMORY" PCB. For "CINE MEMORY"PCB, a plane number is added to it in addition to X-, Y-direction addresses to get output CA0/~8/. The address counter initial values X0 and Y0 from the "US ITF" PCB are transferred by L DATA 0~7 for each line of ultrasound. Loading of L DATA 0~7 is timed by the DECODER. On the other hand, memory address (BT MAP/) used for MPU access to the memory has to be entered into the counter through the address bus, and therefore a selector is used to switch over the counter input line.

This DSC uses simultaneous writing of two pixels, which needs two kinds of address output per memory write cycle. The simultaneous writing beyond one block (8×2 pixels) is not made ,however, those two address are same except the lower 3bits in X-direction and the lowest bit in Y-direction. Therefore two kinds of address, A(MA0A~MA3A) and B(MA0B~MA3B), are simultaneously output for MA00~MA03, and one kind of address is output for MA04~MA17. Also, XFULL A, B and YFULL A, B signals are generated to show whether two adjacent pixels are in the same block or not. If the first pixel causes this signal to become HIGH Level, no simultaneous writing of two pixels is made. So, this signal is used for judging whether writing of two pixels is made simultaneously or separately. To cope with unnecessary count of the address counter which takes place even when no simultaneous writing is made, X-latch and Y-latch are used for the respective address latches to hold addresses regarded as necessary according to the foregoing judgment, waiting for the next writing timing.

Accordingly, the write address MA04~17 has only one kind of output. The address MA04~17 uses a common line for both read address and write address. Output of write address is allowed by WRGT/ only when the memory is in the write cycle, so that read address and write address do not fall on the line at the same time. Output of read address is allowed by TV ADR/ only when the memory is in the read cycle.

B. READ ADDRESS

The READ ADDRESS COUNTER consists of the vertically-directional address counter and the horizontally-directional address counter.

The vertical address counter makes 512 counts per frame (2 fields) of TV scanning. The initial value of read address is sent out of MPU and is set to the counter for each field at VLOAD/ timing. Then DLHCK/signal is fed to the counter as a clock. This signal is a pulse clock which generates two pluses per 1H (one horizontal scanning), and therefore the counter counts up by two per 1H. This is attributed to interlaced scanning.

Among 10 bits of counter output, only RVA1~8 (MA10~17) are actually used for memory address. The lowest bit is used as YADR0 output to "TIMING." Since one-address data (corresponding to 16-pixel data) read out of MASS MEMORY is associated with 8 horizontal pixels and 2 vertical pixels, there is the necessity of selecting either the upper 8 pixels or the lower 8 pixels for display on the monitor. YADR0 is used for this selection operation. On the other hand, RVA8 is used as an area designation signal for the purpose of erasing either the upper or lower half of the screen during OFFSCREEN, ERASE.

The horizontal address counter is loaded by HRSET and operated by the 12MHz clock. The lower 3 bits is not fed as MEMORY ADDRESS and data output is made by shifting IMAGE DATA with SHIFT REGISTER.

At the time of Cine scrolling, OFFSET data is added to horizontal address (MA04~09) output from the gate array.

C. ACCESS ADDRESS

The address generator for MPU access consists of the X-address counter and the Y-address counter.

By setting X, Y address to this circuit, any optional pixel is designated on the memory and read/write from the MPU side becomes possible. The X-address counter is not only used as a register for specifying address, but also able to perform auto increment action to update the address each time when the MPU gains access to the memory.

Each address output utilizesthe read/write address bus (MA00~17) in common. Output to the bus is synchronized with memory cycle only when the MPU issues an access instruction.

2) Plane Control Circuit

A. WRITE PLANE

FEND/ (in B mode), MEND/ (in M mode), or VLOAD/ (in Erase), any one is selected by the selector, and served as a plane clock. The plane clock increments counter output (LPCRA 0~3, RPCRA 0~3), which is converted by the PLANE CONVERSION RAM into actual write plane number. This feature is for the purpose of substituting a reserved non-write plane for a plane to be stored by rewriting data for the PLANE CONVERSION RAM in B mode storage. (Store of planes is made by DMA transfer in mode M, D, and by the above substitution operation for B or by DMA transfer for * in made B/*.)

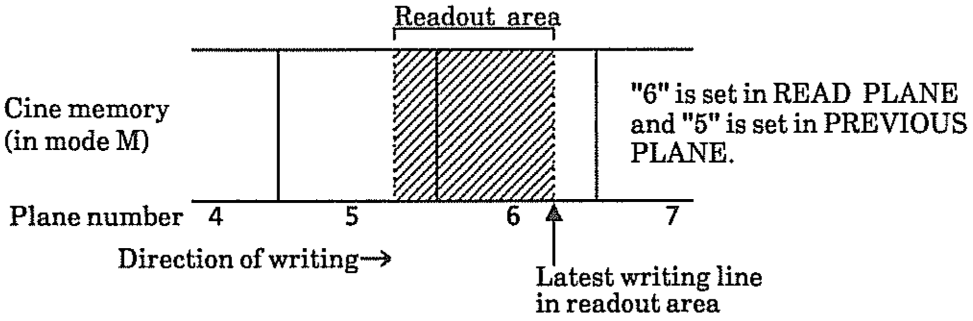
In realtime, plane number is used for both display and write. In realtime display, display frame is synchronized with TV frame, and DISP/WRITE PLANE SEL subtract 1 from the output of PLANE COUNTER not to display the plane which is on the way of writing. On the other hand, for write plane DISP/WRITE PLANE SEL outputs the data from PLANE COUNTER as it is.

B. READ PLANE

The read plane and write plane are switched over to each other by WRPLN/.

The MPU reads a write plane just before freezing and, on the basis of it, sets a read plane number on the READ PLANE register. Cine searching operation is also made by rewriting this register. In M, D mode, a read plane may extend over two planes in some cases. In such a case, a plane number with rather early coming data is set on the PREVIOUS PLANE, while a plane number with rather later coming data is set on the READ PLANE.

Example: When READ PLANE extends over #5 and #6



3) ERASE AREA Decision Circuit

When a writing area is determined (MULTI IMAGE), there is the necessity of using the same area for executing erase.

Since ERASE utilizes READ ADDRESS, ERASE ON/OFF must be decided depending on the value of READ ADDRESS. Basically, setting may be the same one as used for OFF SCRN of writing (writable range). This setting is to be included in software.

4) X-Y Calculator

The X-Y calculator is used for calculating pixel boundary points, by generating LDLB/, NEW BOX/ pulses each time vector passes through a pixel boundary either in X- or Y-direction.

Two calculators are used: X-direction caluculator and Y-direction calculator. They are identical in function and, therefore, only the function of the X-diection calculator is described below.

During blanking of echo video, or during "H" level of SWPON signal, ΔX (LDATA 0~7) from the "US ITF" PCB is set to the X-PIXEL BOUNDARY CALCULATOR. ΔX represents X component of a vector. That is, it is a value indicating an advance per unit time of a vector in X direction.

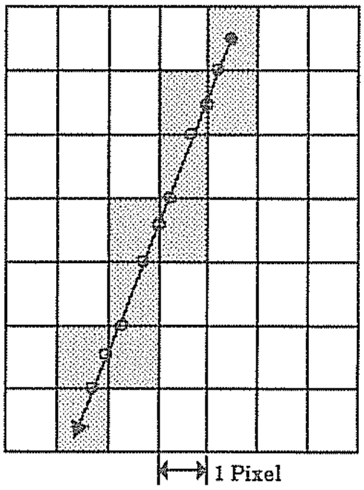
$X = X0 + \Delta X \cdot t$ X, Y : Coordinates of vector t : time

$Y = Y0 + \Delta Y \cdot t$ X0, Y0 : Initial coordinates of vector

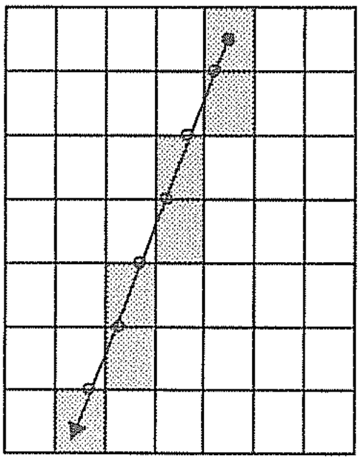
Since ΔX is 2-byte (16-bit) data, it is divided into two, H byte and L byte, which are set independently from each other. The calculator starts its action after SWPON/ signal turns to Low and DFC signal to High.

After a time set by ΔX passes, the calculator generates CARRY signal output which informs that a vector advances by 1 pixel in X direction. As far as DFC signal is Low, action of the calculator is kept stopped. Therefore, the signal of a vector can be stopped while the vector is out of the focus area.

Then, signals INC X, INC Y, and LDLB/ are generated by using X, Y CARRY signals. INC X, Y are counter enable signals which causes increment of the WRITE ADDRESS COUNTER by one in X- and Y-directions, respectively. LDLB/ is the LINE BUFFER write request output signal generated in pixel movement. Detection of a pixel boundary by a vector is in two ways, namely, the X-AND-Y method and the X-OR-Y method as illustrated below. In the illustration, a straight line represents vector. Mark ○ represents each position regarded as a position to which a pixel is moves and output of LDLB/ signal is made therein.



X-AND-Y method



X-OR-Y method

In this DSC, either the X-AND-Y method or the X-OR-Y method is selected depending on status of XCONT/, YCONT/ signals. (In SSD-680, only the X-OR-Y method can be used.) For the X-AND-Y method, a pixel is regarded as to be moved if a vector intersects either

X- or Y-boundary line of a pixel. On the other hand, for the X-OR-Y method, a pixel is regarded as to be moved only when a vector having an angle below 45° (nearer to vertical) intersects the Y-direction boundary or only when a vector having an angle 45° (nearer to horizontal) intersects the X-direstion boundary.

5) LINE BUFFER

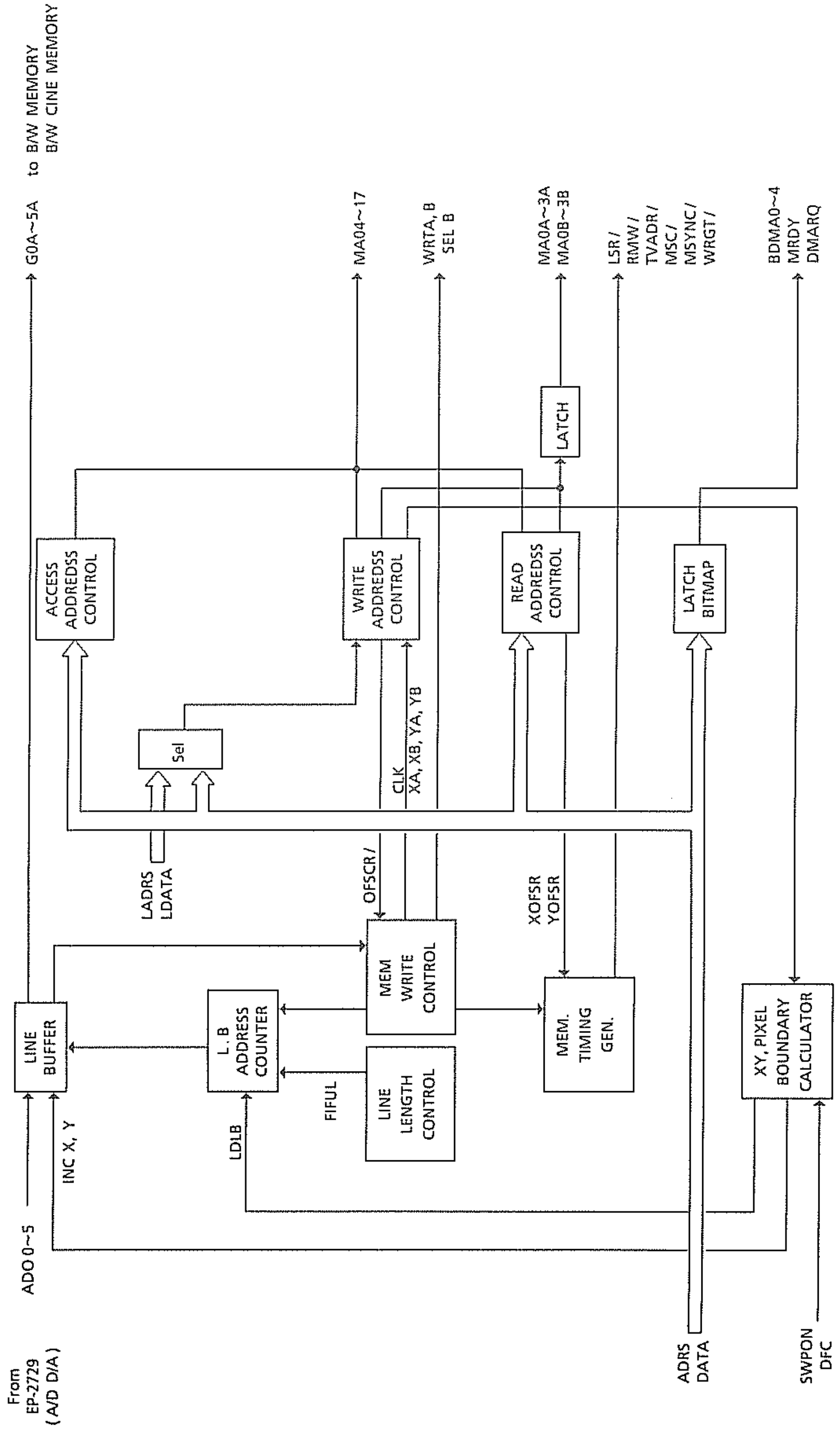
To cope with asynchronism in period between ultrasound repetition and TV scanning, the LINE BUFFER temporarily stores video signal ADO 0~5 sent out of the "A/D, D/A" PCB until arrival of writing timing of the MEMORY.

Up to one line of ultrasound is stored and read out from time on time. The BUFFER is FIFO (First-in, First-out) which allows readout in the same order as used for writing. Also, ICR X,Y *are stored at the same time to indicate the direction of the array of pixels* requiring writing of the next data. The readout/ write addresses of the LINE BUFFER are generated in the L.B ADDRESS COUNTER. Writing has precedence over readout. Readout is made in the intervals of writing and in time with writing cycle of the memory.

6) MEMORY WRITE CONTROL

The MEMORY WRITE CONTROL circuit controls writing on the memory, especially for determining whether simultaneous writing on two pixels is made or not. Simultaneous writing on two pixels is possible if both WRTA/ and WRTB/ are Low. Writing on a single pixel only is possible if either WRTA/ or WRTB/ is Low. In the case of simultaneous writing on two pixels, two kinds of MA00~03 are also generated.

Clock singles CLK XA, XB and CLK YA, YB are generated by waveform shaping of ICR X, Y singles (giving data to indicate which direction writing on the array of pixels is made next time) in time with writing cycle of the memory so that they are able to serve as the clock for the address counter.

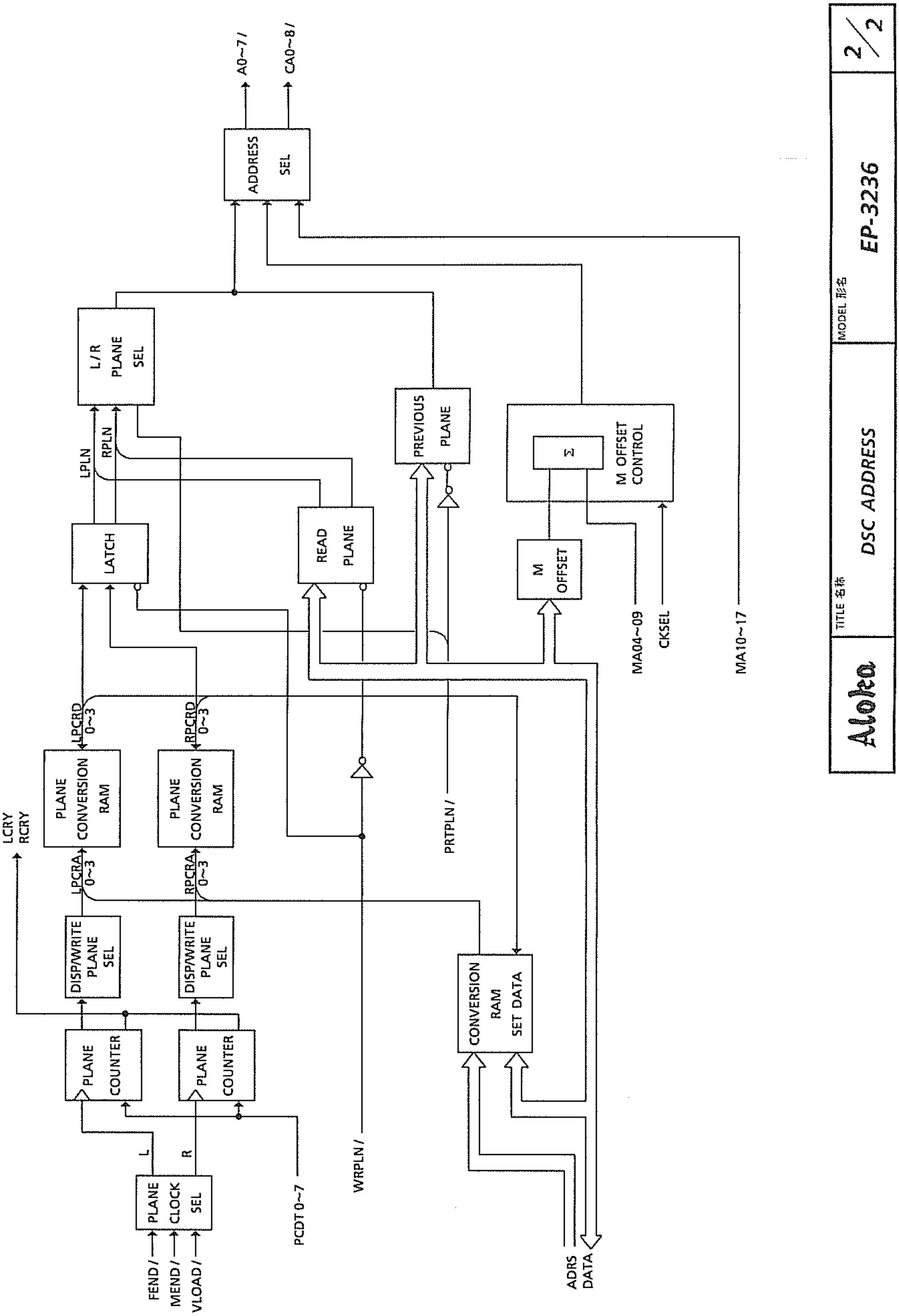

From
EP-2729
(A/D D/A)
ADO 0~5
INC X, Y
LINE
BUFFER
G0A~5A
to B/W MEMORY
B/W CINE MEMORY
LDLB
L. B
ADDRESS
COUNTER
FIFUL
LINE
LENGTH
CONTROL
MEM
WRITE
CONTROL
MEM.
TIMING
GEN.
ACCESS
ADDREDSS
CONTROL
LADRS
LDATA
Sel
OFSCR/
CLK
XA, XB, YA, YB
WRITE
ADDREDSS
CONTROL
MA04~17
WRTA, B
SEL B
XOFSR
YOFSR
READ
ADDREDSS
CONTROL
LATCH
MA0A~3A
MA0B~3B
L5R/
RMW/
TVADR/
MSC/
MSYNC/
WRGT/
LATCH
BITMAP
BDMA0~4
MRDY
DMARQ
XY, PIXEL
BOUNDARY
CALCULATOR
ADRS
DATA
SWPON
DFC

Aloka

TITLE 名称 DSC ADDRESS

MODEL 形名 EP-3236

1/2


A0~7 /
CA0~8 /
ADDRESS SEL
L/R PLANE SEL
LPLN
RPLN
LATCH
READ PLANE
PREVIOUS PLANE
M OFFSET CONTROL
Σ
M OFFSET
MA04~09
CKSEL
MA10~17
LPCRD 0~3
RPCRD 0~3
PLANE CONVERSION RAM
PLANE CONVERSION RAM
LCRY
RCRY
LPCRA 0~3
RPCRA 0~3
DISP/WRITE PLANE SEL
DISP/WRITE PLANE SEL
PLANE COUNTER
PLANE COUNTER
L
R
PLANE CLOCK SEL
FEND /
MEND /
VLOAD /
PCDT 0~7
WRPLN /
PRTPLN /
CONVERSION RAM SET DATA
ADRS
DATA
Aloka
TITLE 名称
DSC ADDRESS
MODEL 形名
EP-3236
2/2

16-16 EP-3620 DSC TIMING

1. General

This PCB consists of the timing generating circuit, horizontal smoothing circuit, line memory circuit, and memory timing control circuit

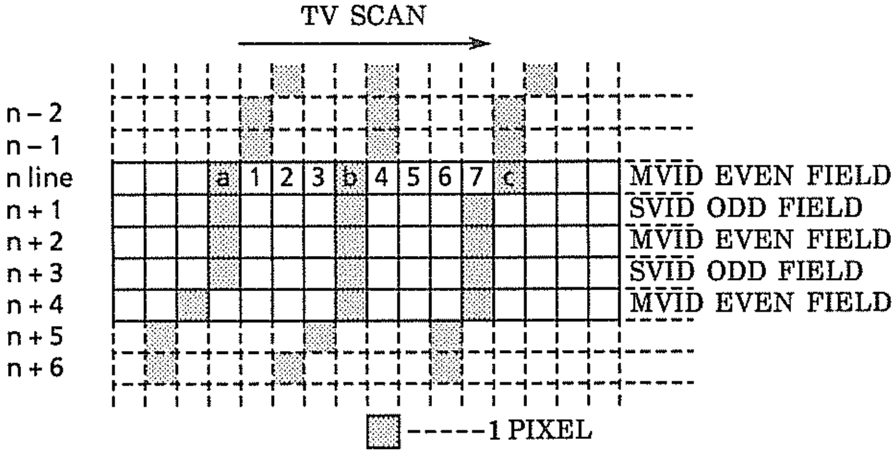
2. Operation

1) TIMING GENERATING CIRCUIT

With reference to the 12 MHz master clock which the crystal oscillator generates, the timing generating circuit generates the memory timing (horizontal timing and vertical timing), TV sync signal, etc. by means of the ROM based timing generation method.

2) HORIZONTAL SMOOTHING CIRCUIT

The pixels lacking in data completely, such as shown by numbers 1 to 7, are interpolated by filling "a", "b" and "c" with weighted data. Although filling up to 11 pixels maximum is possible by this circuit, the maximum number of pixels can be selected by software setting means.

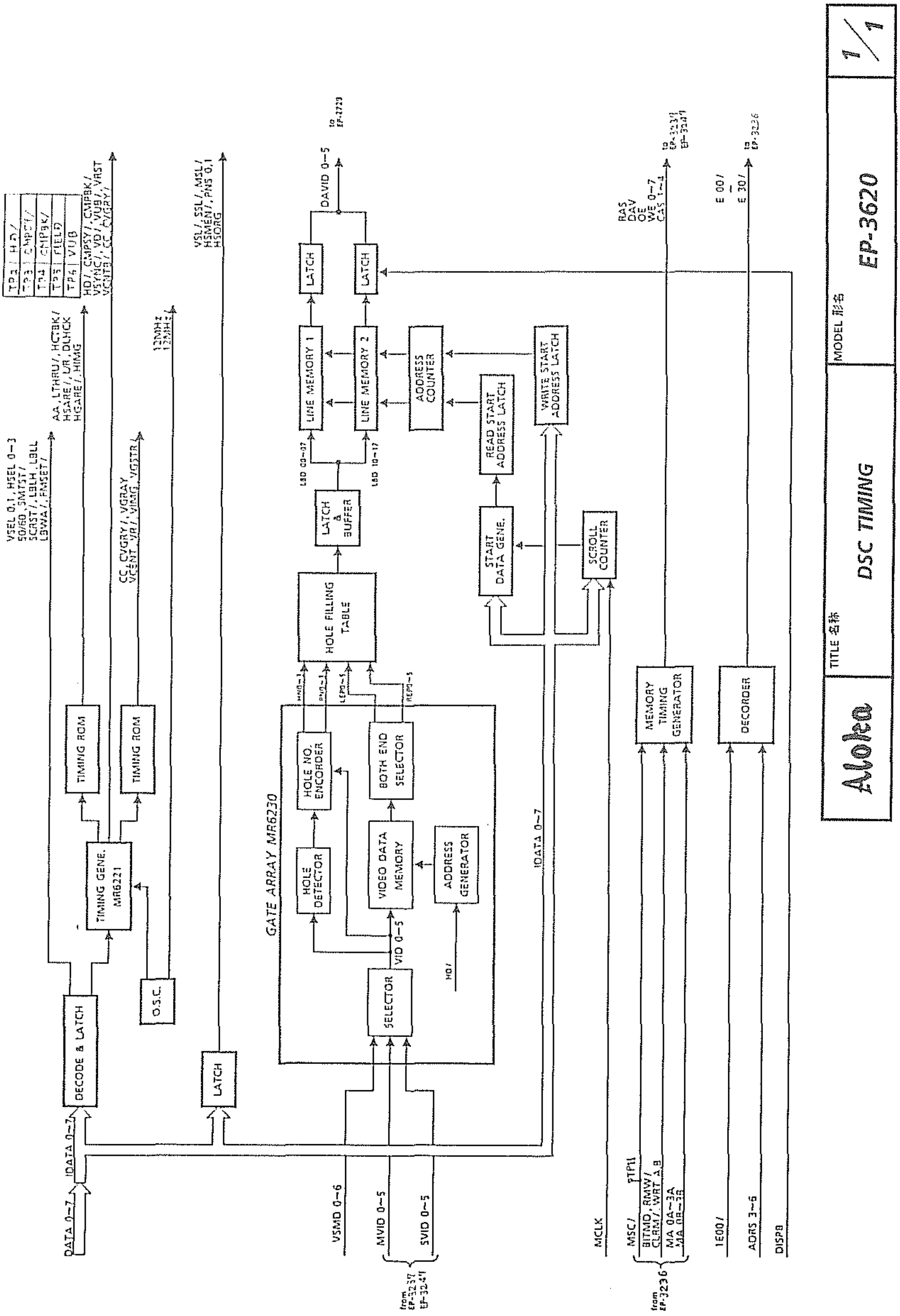

TV SCAN
n − 2
n − 1
n line
n + 1
n + 2
n + 3
n + 4
n + 5
n + 6
a
1
2
3
b
4
5
6
7
c
$\overline{\text{MVID}}$ EVEN FIELD
$\overline{\text{SVID}}$ ODD FIELD
$\overline{\text{MVID}}$ EVEN FIELD
$\overline{\text{SVID}}$ ODD FIELD
$\overline{\text{MVID}}$ EVEN FIELD
-----1 PIXEL

3) LINE MEMORY CIRCUIT

The line memory circuit is for the purpose of making M-mode scroll possible. while the address for starting writing in to the line memory being always kept constant, scroll is made by moving the reading start address.

4) MEMORY TIMING CONTORL

This circuit generates the timing signal necessary for the main memory to read or write data.


DATA 0~7
IDATA 0~7
DECODE & LATCH
VSEL 0,1, HSEL 0~3
50/60, SMTST/
SCRST/, LBLH, LBLL
LBWA/, FMSET/
TIMING GENE. MR6221
TIMING ROM
AA, LTHRU/, HCTBK/
HSARE/, UR, DLHCK
HGARE/, HIMG
TIMING ROM
CC, CVGRY/, VGRAY
VCENT, VR/, VIMG, VGSTR
TP2 | HD/
TP3 | CMPST/
TP4 | CMPBK/
TP5 | FIELD
TP6 | VUB
HD/, CMPSY/, CMPBK/
VSYNC/, VD/, VUB/, VRST
VCNTB/, CC, CVGRY/
O.S.C.
12MHz
12MHz/
LATCH
VSL/, SSL/, MSL/
HSMEN/, PNS 0,1
HSORG
GATE ARRAY MR6230
SELECTOR
VID 0~5
HOLE DETECTOR
HOLE NO. ENCORDER
VIDEO DATA MEMORY
BOTH END SELECTOR
ADDRESS GENERATOR
HD/
HNO-1
PNO-1
LEPD-1
REPD-1
HOLE FILLING TABLE
LATCH & BUFFER
LBD 00~07
LBD 10~17
LINE MEMORY 1
LINE MEMORY 2
LATCH
LATCH
DAVID 0~5
to EP-2723
ADDRESS COUNTER
READ START ADDRESS LATCH
WRITE START ADDRESS LATCH
START DATA GENE.
SCROLL COUNTER
IDATA 0~7
VSMD 0~6
MVID 0~5
SVID 0~5
from EP-3237 EP-3247
MCLK
MSC/
FTP11
BITMD, RMW/
CLRM/, WRT A,B
MA 0A~3A
MA 0B~3B
from EP-3236
1E00/
ADRS 3~6
DISPB
MEMORY TIMING GENERATOR
RAS
DAV
OE
WE 0~7
CAS 1~4
to EP-3237 EP-3247
DECORDER
E 00/
~
E 30/
to EP-3236
Aloka
TITLE 名称
DSC TIMING
MODEL 形名
EP-3620
1/1

16-17 EP-2729 A/D , D/A

1. General

This PCB consists of the A/D CONVERTER, POST PROCESSOR, and D/A CONVERTER.

The A/D CONVERTER converts the analog video signal from the Tx & Rx UNIT into the digital video signal.

The POST PROCESSOR changes in brightness of video signals from the B/W MAIN MEMORY and B/W CINE MEMORY.

The D/A CONVERTER convertsthe digital video signal into the analog video signal, and after the TV synchronizing signal is added to it, outputs a B/W composit video signal for TV.

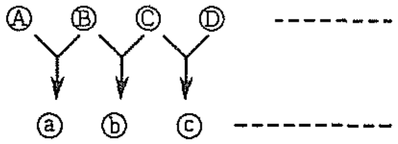
2. Principle of operation

1) A/D CONVERTOR

An ultrasonic echo is converted into digital signal.

2) LINE CORRELATOR (SSD-680EX does not use Line correlator.)

Line correclator outputs ultrasonic echoes after obtaining average between the first echo and the one transferred next.



$ⓐ = \frac{Ⓐ + Ⓑ}{2}$, $ⓑ = \frac{Ⓑ + Ⓒ}{2}$

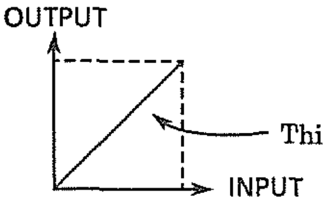
A B, C, and D are true data indicating one ultrasonic.
The output signal is the average of A and B.

3) GRAY BAR GENERATOR

This circuit generates GRAY SCALE BAR to be displayed on the monitor.

4) POST PROCESS

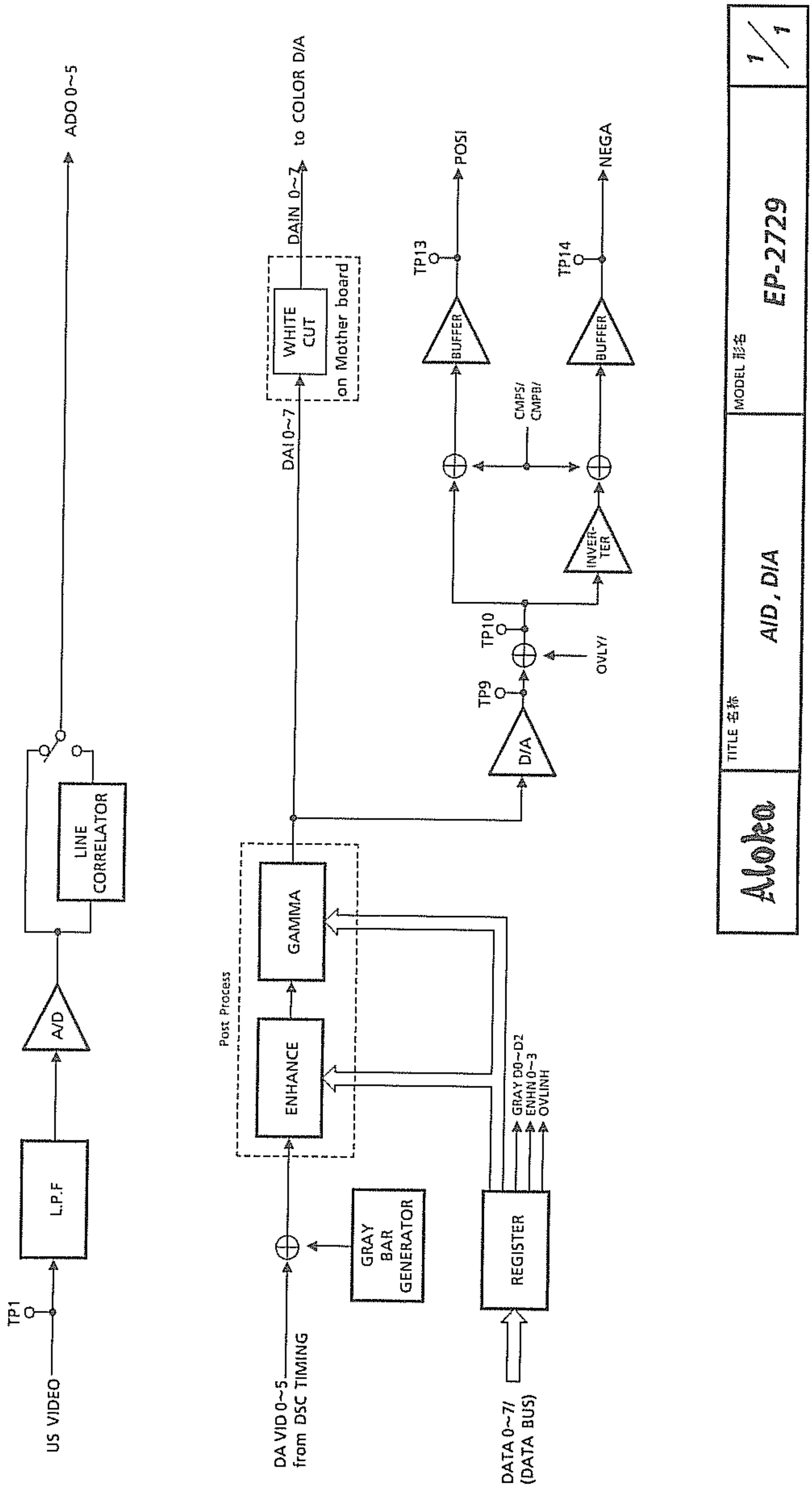
This circuit consists of ENHANCE and GAMMA.
This circuit is used to vary monitor brightness characteristics for echoes.



This characteristic can be varied.

5) D/A CONVERTOR

This circuit generates TV SIGNAL for B/W.


US VIDEO
TP1
L.P.F
A/D
LINE CORRELATOR
ADO 0~5
DA VID 0~5
from DSC TIMING
GRAY BAR GENERATOR
Post Process
ENHANCE
GAMMA
DAI 0~7
WHITE CUT
on Mother board
DAIN 0~7
to COLOR D/A
DATA 0~7/
(DATA BUS)
REGISTER
GRAY D0~D2
ENHN 0~3
OVLINH
D/A
TP9
OVLY/
TP10
INVER-TER
CMPS/
CMPB/
BUFFER
BUFFER
TP13
TP14
POSI
NEGA
Aloka
TITLE 名称
A/D , D/A
MODEL 形名
EP-2729
1/1

16-18 EP-2913 DUAL MPU

1. General

This PCB using two 8-bit MPUs (HD68B09) is roughly divided into two parts -- one is the DSC part which controls the DSC and periphery I/O and the other is the measuring part which takes part in measurement.

For communication between the two MPUs of this PCB and the MPU on the A-GDC board, a special system bus in used. Through that bus, information given at the control panel is sent to each MPU and, under the condition determined by given information, each MPU gives and takes information and data to and from various circuits through local buses.

2. Principle of operation

1) MPU (Micro Processing Unit)

Both the DSC control part and the measuring part have the individual MPUs (HD68B09) which operate at 8 MHz of clock frequency.

2) PTM (Programmable Timer Module)

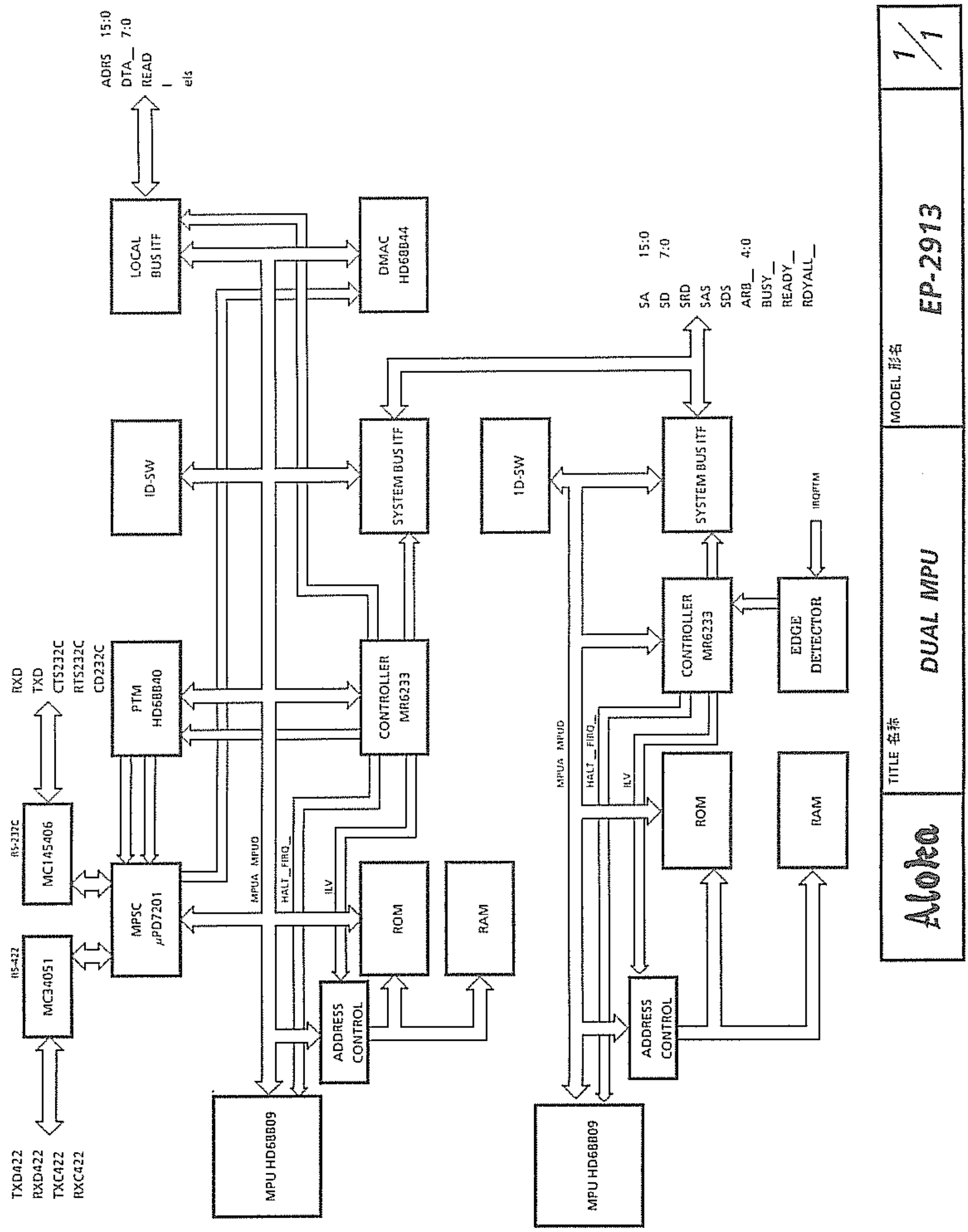
The DSC control part uses HD68B40 for its PTM. This LSI includes three independent programmable counters -- #1 counter is used for the MPSC transmission/receive clock B; #2 counter is used for the transmission clock of RS422 for external communication use; and #3 counter, to which 8 MHz clock is input, is used for the system timer of MPU.

3) MPSC (Multi Protocol Serial Controller)

The MPSC in the DSC control part has two independent serial interfaces.

4) SBI (System Bus Interface)

Both the DSC control part and measuring part have the individual system buses which are the bus lines supporting the multi-processors.


ADRS 15:0
DTA_ 7:0
READ
els
LOCAL BUS ITF
DMAC HD68B44
1D-SW
SYSTEM BUS ITF
PTM HD68B40
CONTROLLER MR6233
RXD
TXD
CTS232C
RTS232C
CD232C
RS-232C
MC145406
RS-422
MC34051
MPSC μPD7201
MPUA MPUD
HALT_FIRQ_
ILV
ROM
RAM
ADDRESS CONTROL
MPU HD68B09
TXD422
RXD422
TXC422
RXC422
SA 15:0
SD 7:0
SRD
SAS
SDS
ARB_ 4:0
BUSY_
READY_
RDYALL_
1D-SW
SYSTEM BUS ITF
IRQPTM
CONTROLLER MR6233
EDGE DETECTOR
MPUA MPUD
HALT_FIRQ_
ILV
ROM
RAM
ADDRESS CONTROL
MPU HD68B09
Aloka
TITLE 名称
DUAL MPU
MODEL 形名
EP-2913
1/1

16-19 EP-2629 AGDC

1. General

This PCB controls the character and graphic displays.
It consists of the following:

1) MPU
2) CHARACTER CONTROLLER
3) GRAPHIC CONTROLLER

2. Operation

1) The MPU has the following functions:

MPU (Uses the speedup version of MC6809.)
PROGRAM ROM (keeps 56K bytes ranging in address from $20DD to $FFFF for the ROM region.)
SCRATCH RAM (Standard mounting of 8K-byte C-MOS SRAM)
SBI (System Bus Interface used for communication with other MPUs)
RTC (Real Time Clock used for 1-sec interval interruption to the MPU)
PTM (Programmable Timer Module used mainly for display of 10-ms units of timer)
ID-SW (ID Switch which is a 2-byte dip switch)
LOCAL BUS (Outputs MPU's address data, etc. Graphic and character controllers are connected to this LOCAL BUS.)

2) CHARACTER CONTROLLER

Display format (Either A or B below is selected.)

A. 64 characters (in a line)×40 characters (in a column)× 2 pages; each character is composed of 10 x 12 dots
B. 40 characters (in a line)×30 characters (in a column)× 2 pages; each character is composed of 16×16 dots

The CHARACTER CONTROLLER has the following functions:

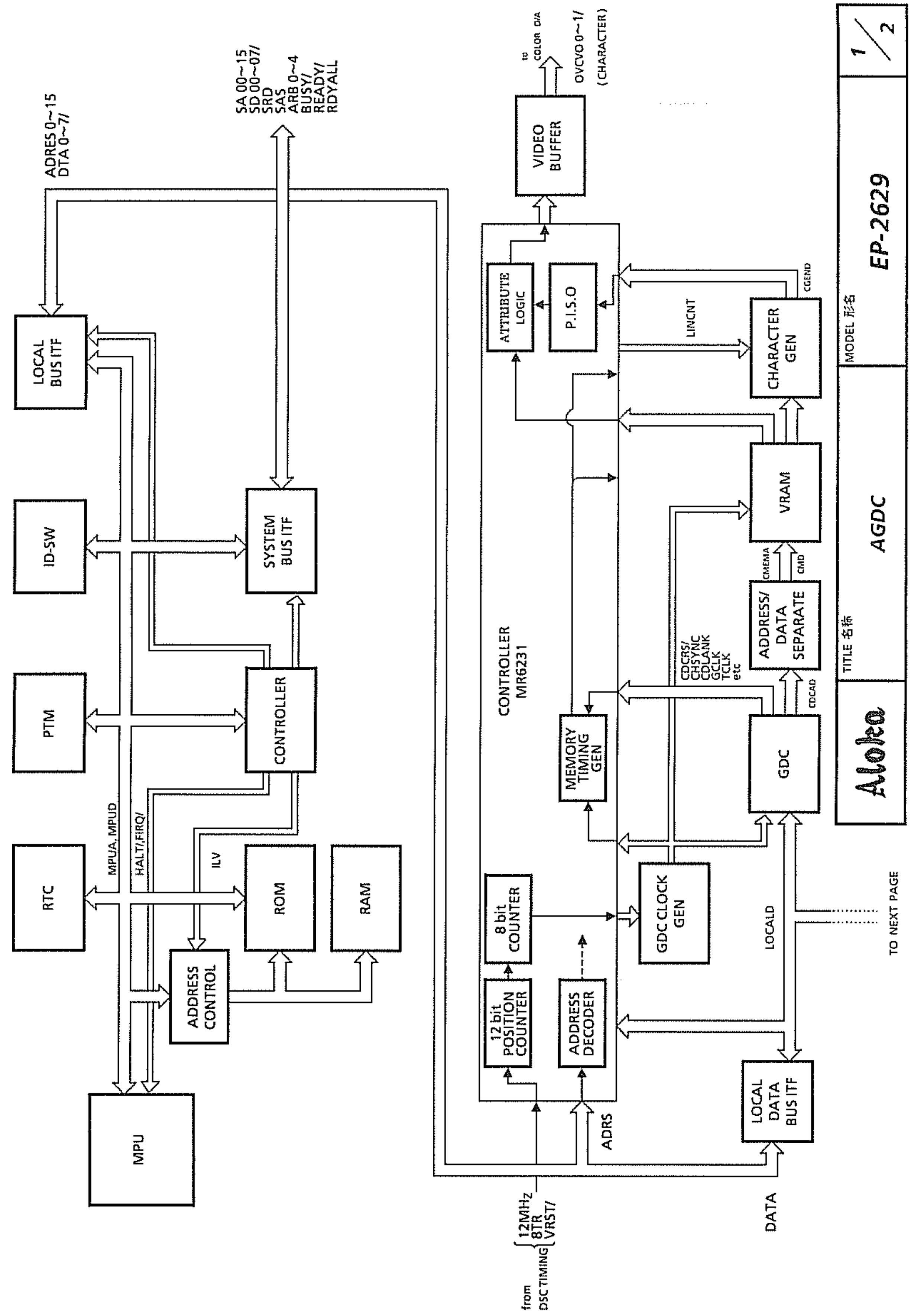
CLOCK generation (To get synchronization with the DSC's system clock, the controller generates timing signals necessary for inside operations on receipt of the external VRST signal which indicates the start of 12 MHz system clock and TV display.)
CONTROLLER (Generates memory's readout address in time with TV display timing. Reading and writing data from and to the memory at a command by the MPU.)
DISPLAY MEMORY (Two 8-byte SRAMs are used.)
CHARACTER GENERATOR (Data read out of the display memory is converted into video data by the character generating ROM.)
VIDEO output (Output of the character generator is used for output signal fo this PCB after the serial-parallel conversion, attribute addition, and synchronization with the system clock (12 MHz).)

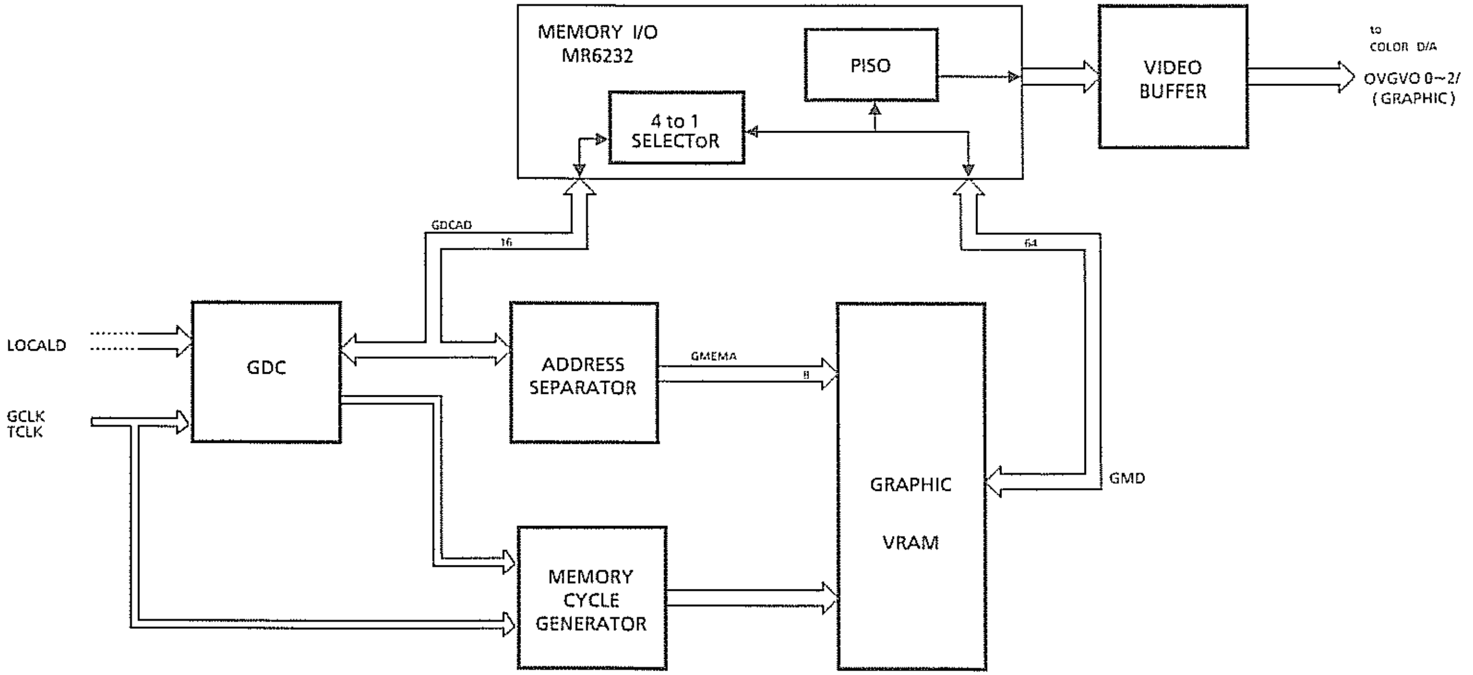
3) GRAPHIC CONTROLLER

Display format: 640×240 dots×4 pictures

The graphic controller has the following functions:

CLOCK generation	(Display timing is synchronized with DSC's TV timing.)
CONTROLLER	(Like the character part, a memory for graphic display is under control independent of the MPU's address space.)
DISPLAY MEMORY	(16 chips of 16K×4 bits DRAM are used. 4 chips for each picture)
VIDEO output	(Data read out from DRAMs is outputted for 4 lines of video signals (GVO 0-3) after parallel-serial conversion.)


LOCAL BUS ITF
ADRES 0~15
DTA 0~7/
ID-SW
PTM
RTC
MPU
MPUA, MPUD
HALT/,FIRQ/
ILV
SYSTEM BUS ITF
SA 00~15
SD 00~07/
SRD
SAS
ARB 0~4
BUSY/
READY/
RDYALL
CONTROLLER
ROM
RAM
ADDRESS CONTROL
VIDEO BUFFER
TO COLOR D/A
OVCVD 0~1/
(CHARACTER)
CONTROLLER
MR6231
ATTRIBUTE LOGIC
P.I.S.O
LINCNT
CGEND
CHARACTER GEN
VRAM
CMEMA
CMD
ADDRESS/ DATA SEPARATE
CDCAD
CDCRS/
CHSYNC
CDLANK
GCLK
TCLK
etc
MEMORY TIMING GEN
GDC
GDC CLOCK GEN
8 bit COUNTER
12 bit POSITION COUNTER
ADDRESS DECODER
LOCALD
TO NEXT PAGE
LOCAL DATA BUS ITF
ADRS
DATA
from DSC TIMING
12MHz
8TR
VRST/
Aloka
TITLE 名称
AGDC
MODEL 形名
EP-2629
1/2


MEMORY I/O
MR6232
PISO
4 to 1
SELECTOR
VIDEO
BUFFER
to
COLOR D/A
OVGVO 0~2/
(GRAPHIC)
GDCAD
16
64
LOCALD
GCLK
TCLK
GDC
ADDRESS
SEPARATOR
GMEMA
8
GRAPHIC
VRAM
GMD
MEMORY
CYCLE
GENERATOR

Aloka	TITLE 名称 AGDC	MODEL 形名 EP-2629	2/2

16-20 EP-3477 US ITF

1. General

This PCB consists of the various kinds of circuit such as ROM TABLE, ECHO ERASE, M-MODE TIME MARKER, TRACK BALL READ, and OPTION BOARD DETECTION circuits, which hold information necessary for writing in US signal to the memory.

2. Operation

1) GEU INTERFACE

LSTAT/, FREND, and DFAREA which the GEU sends out are latched by 12 MHz of basic clock of DSC, and then sent to the various parts in DCS. VCD 0/ and 1/ are decoded and sent to the various parts in the PCB. DSCA 0 to 8 are sent to the ROM TABLE through the folding circuit.

2) ADDRESS DEODER & LATCH

Functions as the register which sets up the MPU about the current operational state of the equipment (MAG, PROBE, etc.)

3) ROM TABLE

Stores X0, Y0, △X and △Y which determine the display format of supersound echo image. Those ROM data are sent to the "ADDRESS" PCB as LDAT 0 to 7 for each line during blanking of US.

4) M-MODE CONTROL

The X0 ADDRESS COUNTER for writing control in M-mode generates M addresses, one after another, which are sent to the "ADDRESS" PCB as LDAT 0 to 7. During M-mode, Y0 is set up by the MPU.

5) FREEZE CONTROL

Freeze control in B-mode and that in M(D)-mode are independent of each other. Freeze is executed at the end of frame in the case of B-mode, and at the end of US line in the case of M(D)-mode.

6) ECHO ERASE

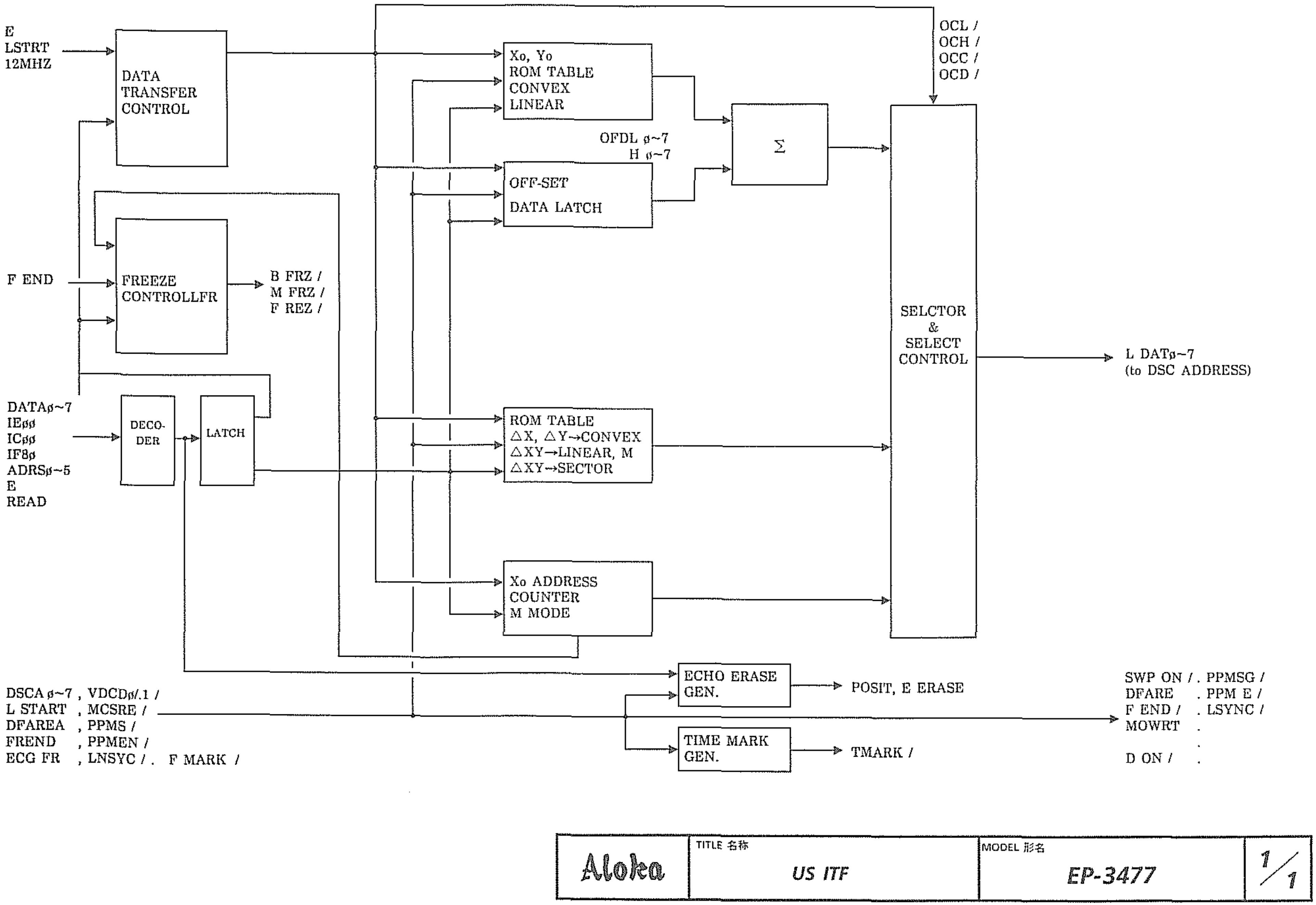
On the basis of the MPU set values, the ERASE signal is generated to define the area in which the echo is erased.

7) TIME MARKER

Generates TIME MARKERS for M-mode use having a width corresponding to two pixels, at intervals of 0.5 ms in the timeaxis direction and at intervals of 1 cm in the depth direction.

8) TRACK BALL COUNTER

Signals (XPLAS/, XMINS/, YPLAS/, YMINS/) from the TRACK BALL are counted up in the X- and Y-directions independent of each other, and the result is read in to the MPU.


E
LSTRT
12MHZ
DATA TRANSFER CONTROL
F END
FREEZE CONTROLLFR
B FRZ /
M FRZ /
F REZ /
DATAø~7
IEøø
ICøø
IF8ø
ADRSø~5
E
READ
DECO-DER
LATCH
Xo, Yo ROM TABLE CONVEX LINEAR
OFDL ø~7
H ø~7
OFF-SET DATA LATCH
ROM TABLE
ΔX, ΔY→CONVEX
ΔXY→LINEAR, M
ΔXY→SECTOR
Xo ADDRESS COUNTER M MODE
Σ
OCL /
OCH /
OCC /
OCD /
SELCTOR & SELECT CONTROL
L DATø~7
(to DSC ADDRESS)
ECHO ERASE GEN.
POSIT, E ERASE
TIME MARK GEN.
TMARK /
DSCA ø~7 , VDCDø/.1 /
L START , MCSRE /
DFAREA , PPMS /
FREND , PPMEN /
ECG FR , LNSYC / . F MARK /
SWP ON / . PPMSG /
DFARE . PPM E /
F END / . LSYNC /
MOWRT .
D ON / .
Aloka
TITLE 名称
US ITF
MODEL 形名
EP-3477
1/1

16-21 EP-2651 COLOR D/A

1. General

This PCB mixes the RGB color flow signal (digital signal) and the B/W echo signal together and converts the mixture into an analog output signal.

2. Principle of operation

1) COLOR SUPPRESSION

This circuit compares the MPU sets value and ultrasonic data, and stop a color signal when an ultrasonic video level exceeds the grade set by MPU.

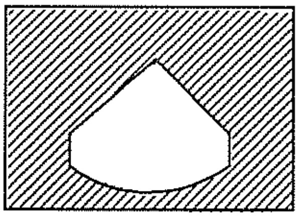
COLOR FLOW data is not displayed on the ultrasonic echo beyond the MPU set value.

2) ADDER

RGB signal (Infromation of V and δ) is mixed with ultrasonic data.

3) OUTER ULTRASOUND IMAGE CONTROLLER

This circuit controls the outside color of ultrasonic image area.



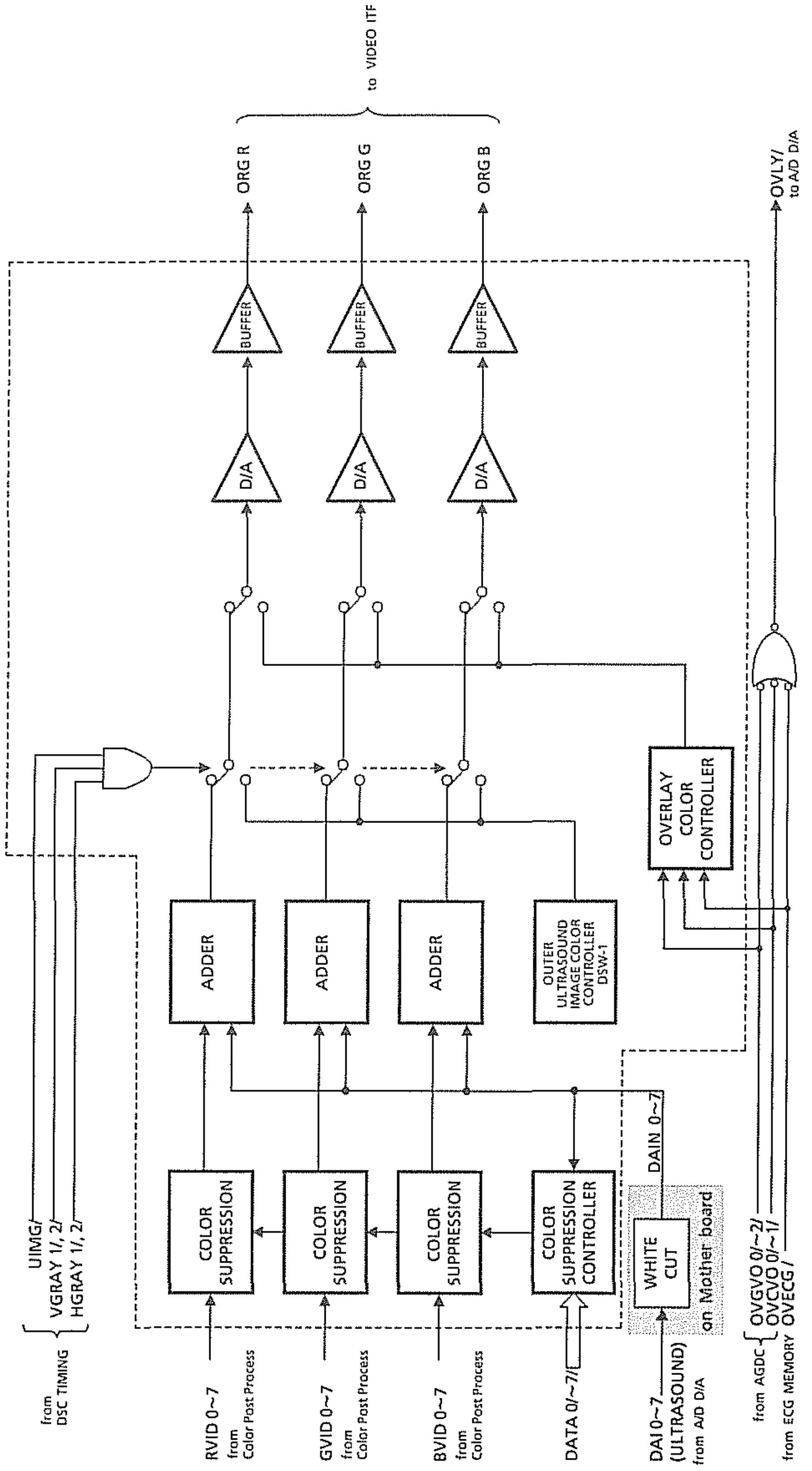
▨ This circuit is controls the color of the shaded section.

4) EVERLAY COLOR CONTROLLER

This circuit determines color when graphic, charactor, ECG are displayed.

5) COLOR D/A

COLOR D/A converts digital RGB signal into analog RGB signal.


to VIDEO ITF
ORG R
ORG G
ORG B
OVLY/ to A/D D/A
BUFFER
D/A
OVERLAY COLOR CONTROLLER
ADDER
OUTER ULTRASOUND IMAGE COLOR CONTROLLER DSW-1
COLOR SUPPRESSION
COLOR SUPPRESSION CONTROLLER
WHITE CUT
on Mother board
DAIN 0~7
UIMG/
VGRAY 1/, 2/
HGRAY 1/, 2/
from DSC TIMING
RVID 0~7 from Color Post Process
GVID 0~7 from Color Post Process
BVID 0~7 from Color Post Process
DATA 0/~7/
DAI 0~7 (ULTRASOUND) from A/D D/A
OVGVO 0/~2/
OVCVO 0/~1/
OVECG/
from AGDC
from ECG MEMORY

TITLE 名称 **COLOR D/A**

MODEL 形名 **EP-2651**

1/1

Aloka

EP-2651＊-4: SSD-680EX用、破線内の部品取り付け
For SSD-680EX, Parts in the dot line are mounted.
EP-2651＊-3: SSD-680STD用、破線内の部品なし
For SSD-680STD, Parts in the dot line are not mounted.

16-22 EP-3237 B/W CINE MEMORY

1. General

This PCB has a storage capacity of full tomography area (512 pixel × 512 pixel × 6 bits) × 16 screens and is used for B/W. Writing of data, similar to that of main memory, is made on the planes in order.

2. Operation

The mass memory consists of 32 D-RAM ICs, a half of which, 16 ICs. being in charge of 4 bits (0~3) of 6-bit gray scale, while the other 16 ICs. of 2 bits (4,5). (The remainder, 2 bits, is not in use.) In the memory, 8 chips are arrayed horizontally in 2 layers; total 16 pixels for each address. *The full tomography is, therefore, formed by 64 addresses in the horizontal direction* and 256 address in the vertical direction.(See EP-3247.) There are 16 planes of such a unit area.

1) Writing on memory (READ MODIFY WRITE)

RMW (Read Modify Write) cycle operation, like the main memory. To increase writing speed, access to and writing on two pixels in the same address are made simultaneously. Under control of CAS1~4, CA0~8 which are created by ADDRESS SELECT in EP-3236, writing on the planes is made in order.

Writing is made through the following planes:

When store function is ON : 1~12 planes
When store function is OFF : 1~16 planes

2) Readout from memory (PARALLEL READ)

Normally, readout is made from the main memory. When FREEZE is touched, however, CIN VID signal causes switch over to readout of the final image of CINE MEMORY *in the switching circuit in the PC. In case of CINE operation, movement of the* track ball is read out through software to select a read plane (which is in control of CAS1~4, CA0~8 created by ADDRESS SELECT in EP-3236).

To make display on the TV monitor, data (1 address data) of total 16 pixels, one pixel from each of 16 RAM CHIPs, are read out simultaneously.

The READ MODIFY WRITE cycle and the PARALLEL READ cycle alternate with each other repeatedly.

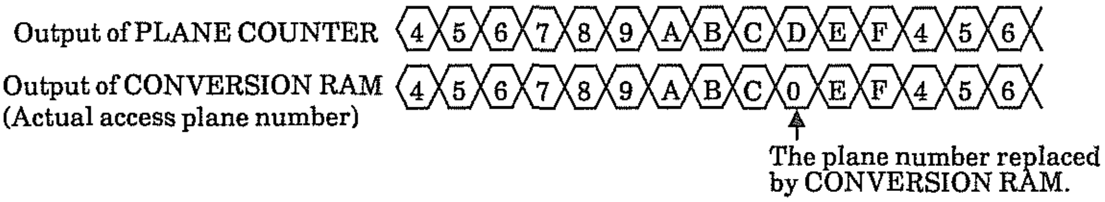
3) Operation when STORE MEMORY is ON

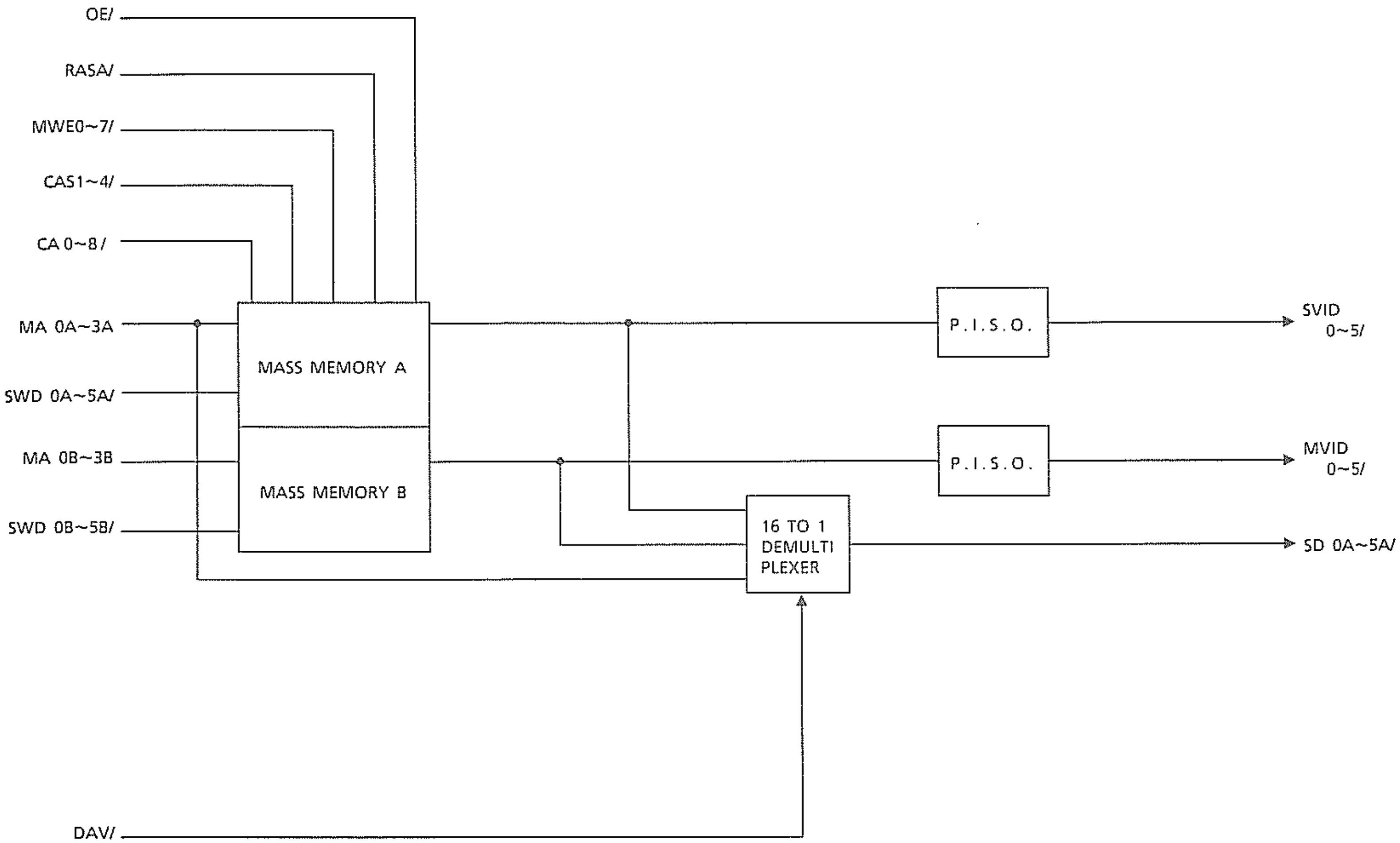
In the B mode, time-consuming DMA transfer is eliminated by substituting a reserved non-write plane for a plane to be stored.

In M, D mode .. DMA transfer
In B/* mode .... B: Operation above, *: DMA transfer

This operation is made by readout after rewriting data of PLANE CONVERSION RAM in EP-3236.

Example: After the image "D" in Cine memory is stored, "0" is used instead of "D".


Output of PLANE COUNTER
4 5 6 7 8 9 A B C D E F 4 5 6
Output of CONVERSION RAM
(Actual access plane number)
4 5 6 7 8 9 A B C 0 E F 4 5 6
The plane number replaced by CONVERSION RAM.


OE/
RASA/
MWE0~7/
CAS1~4/
CA 0~8 /
MA 0A~3A
SWD 0A~5A/
MA 0B~3B
SWD 0B~5B/
DAV/
MASS MEMORY A
MASS MEMORY B
16 TO 1 DEMULTI PLEXER
P.I.S.O.
P.I.S.O.
SVID 0~5/
MVID 0~5/
SD 0A~5A/

Aloka	TITLE 名称 BIW CINE MEMORY	MODEL 形名 EP-3237	1/1

16-23 EP-5100 COLOR FLOW PROCESSOR

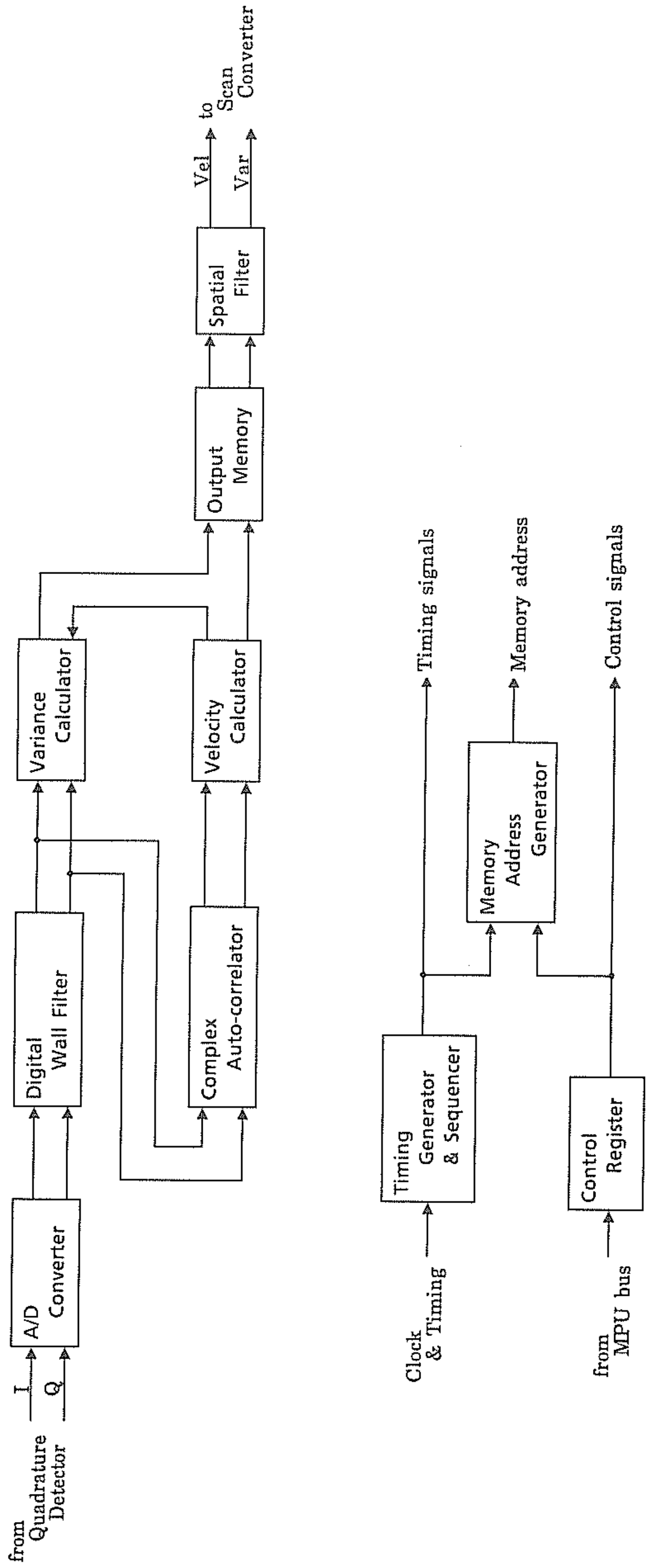
This unit converts the frequency shifts included in the ultrasound reception signal into color information which is to be displayed, as a two-dimensional image, on the B/W (B mode) picture.

The signal to be converted is an ultrasound signal received by the GEU-64. For that signal, velocity and turbulence (variance) are operated, respectively, on the basis of information stored in the internal ROM.

Output signal is sent to the DSC (UIM-325), where the signal and the ultrasonic B/W signal are synthesized and displayed.

Software control for this module is made by the CPU (in EP-2913) in the DSC. Additionally, this unit receives various kinds of control signal and basic clock from the GEU-64.

The unit has a single piece of PCB which is packed in the DSC.


from Quadrature Detector
I
Q
A/D Converter
Digital Wall Filter
Complex Auto-correlator
Variance Calculator
Velocity Calculator
Output Memory
Spatial Filter
Vel
Var
to Scan Converter
Clock & Timing
Timing Generator & Sequencer
Timing signals
Memory Address Generator
Memory address
from MPU bus
Control Register
Control signals

Aloka

TITLE 名称 COLOR FLOW PROCESSOR

MODEL 形名 EP-5100

1/1

16-24 EP-3115 COLOR LINE BUFFER

1. General

This PCB consists of the color test-pattern generating circuit, the color, B/W position correction delay signal generating circuit, the line buffer, and the interface for direct access to the memory from the CPU.

2. Operation

1) COLOR TEST-PATTERN GENERATING CIRCUIT

In this circuit, the velocity pattern and variance pattern are generated by the respective counters. The velocity pattern generator counts the LBF WE signal, while the variance pattern generator counts the SWPON/, (B-MODE), and MCLK (M-MODE). On receipt of a color-test ON signal (CTEST) from the MPU, the LATCH IC succeeding the test-pattern generating counter outputs data.

2) COLOR, B/W position correction delay signal generating circuit

In color signal operation, an analog delay occurs due to existence of the band pass filter preceding the detector in color ITF demodulation and the A.A. filter preceding digital conversion in the operational PCB, in addition to digital operational time necessary for velocity and variance. The amount of delay depends on frequency of the probe, inviting the necessity of alignment of color and B/W with each other for each frequency. This circuit is to synchronize the color data with the B/W data by giving a delay of several μ sec to the color data writing address when writing to the line buffer memory is made. The color data write-in address is set after the amount of delay is determined by means of software. The color data write-in timing is transmitted to the line buffer memory for B/W, and from that timing read-out of B/W is also made.

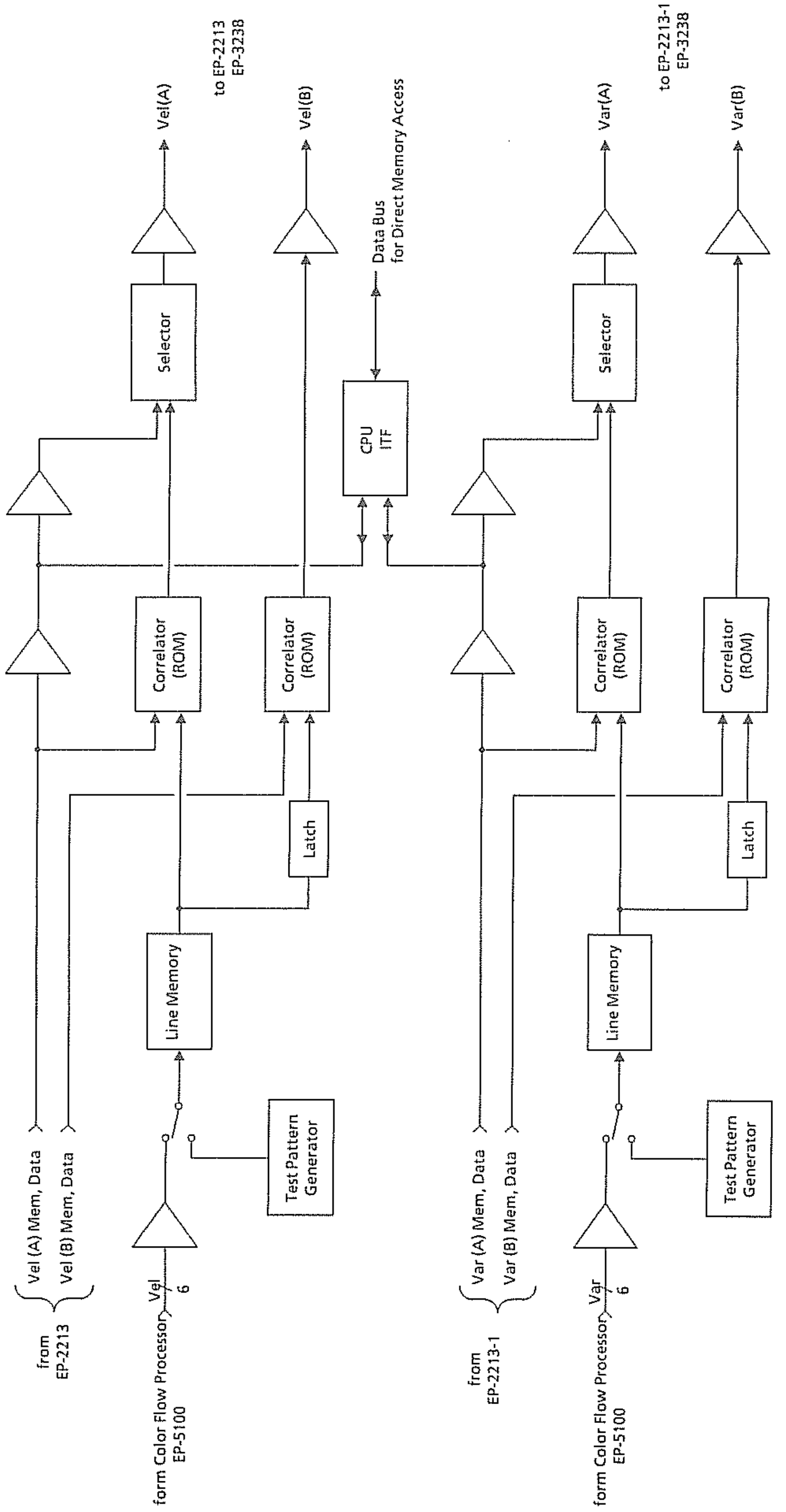
3) LINE BUFFER

This line buffer for color signal (velocity and variance) has the function similar to the line buffer for US video signal (B/W).

Color data is temporarily stored in the line buffer memory. When the data is read out from the line buffer with the cycle of Main memory, it is divided into two parts for the upper stage and lower stage, respectively, corresponded with 2×8 pixels in the Main memory. The line memory read-out data is correlated with the main memory read-out data (one- frame preceding data of the same address) to execute the so called frame correlation. Frame correlation is made at four ROMs in total; two of four ROMs are for two circuits (corresponding to the upper stage pixels and the lower stage pixels, respectively) for velocity data and the remainders are for two circuits for variance data.

4) INTERFACE FOR ACCESS TO MEMORY FROM CPU

There is a gate circuit which allows direct transfer to and from the CPU of the velocity and variance data after frame correlation before the data reaches the output buffer. Through this gate circuit, the CPU is able to read out data from the main memory when data is transferred to the CPU. When data is transferred from the CPU, the data is sent through the output buffer to the main memory and written in it.


from EP-2213
Vel (A) Mem, Data
Vel (B) Mem, Data
form Color Flow Processor EP-5100
Vel
6
Test Pattern Generator
Line Memory
Latch
Correlator (ROM)
Correlator (ROM)
Selector
CPU ITF
Data Bus for Direct Memory Access
Vel(A)
Vel(B)
to EP-2213 EP-3238
from EP-2213-1
Var (A) Mem, Data
Var (B) Mem, Data
form Color Flow Processor EP-5100
Var
6
Test Pattern Generator
Line Memory
Latch
Correlator (ROM)
Correlator (ROM)
Selector
Var(A)
Var(B)
to EP-2213-1 EP-3238

TITLE 名称 **COLOR LINE BUFFER**

MODEL 形名 **EP-3115**

1/1

16-25 EP-3114 COLOR POST PROCESS

1. General

This PCB consists of the color-signal smoothing circuit, the WHT CUT level setting circuit, the color bar selection circuit the RGB conversion circuit, and Frame interpolation circuit.

2. Operation

1) COLOR SMOOTHING CIRCUIT

Data from the velocity-and-variance MEMORY enters the color smoothing circuit, where hole filling of 11 pixel maximum is made. First, the pipe-line register stores the data at both sides of the hole and detects number of holes and pixels to create parameters.

Here, in the velocity hole filling circuit, detection of aliasing and creation of differential data from the right-end data and left-end data are made first. That differential data is weighted by a parameter-dependent value and is added to the right-end data to generate the smoothing data.

On the other hand, in the variance hole filling circuit, like that of B/W, the parameter-weighted left-end data and right-end data are obtained from the hold filling ROM. And those data are summed up to output smoothing data.

2) FRAME INTERPOLATION CIRCUIT

The velocity and variance data after smoothing is procesed by interpolation in the frame interpolation circuit to the maximum of 15 TV frames.

Parameter is created from the number of interpolation frames which is set by means of software on the basis of the interpolation frame number and frame rate. The differential data derived from the 1US frame delay data and the latest US data is weighted by parameter and is added to the latest ultrasound frame data to output interpolation data.

3) WHT-CUT LEVEL SETTING CIRCUIT

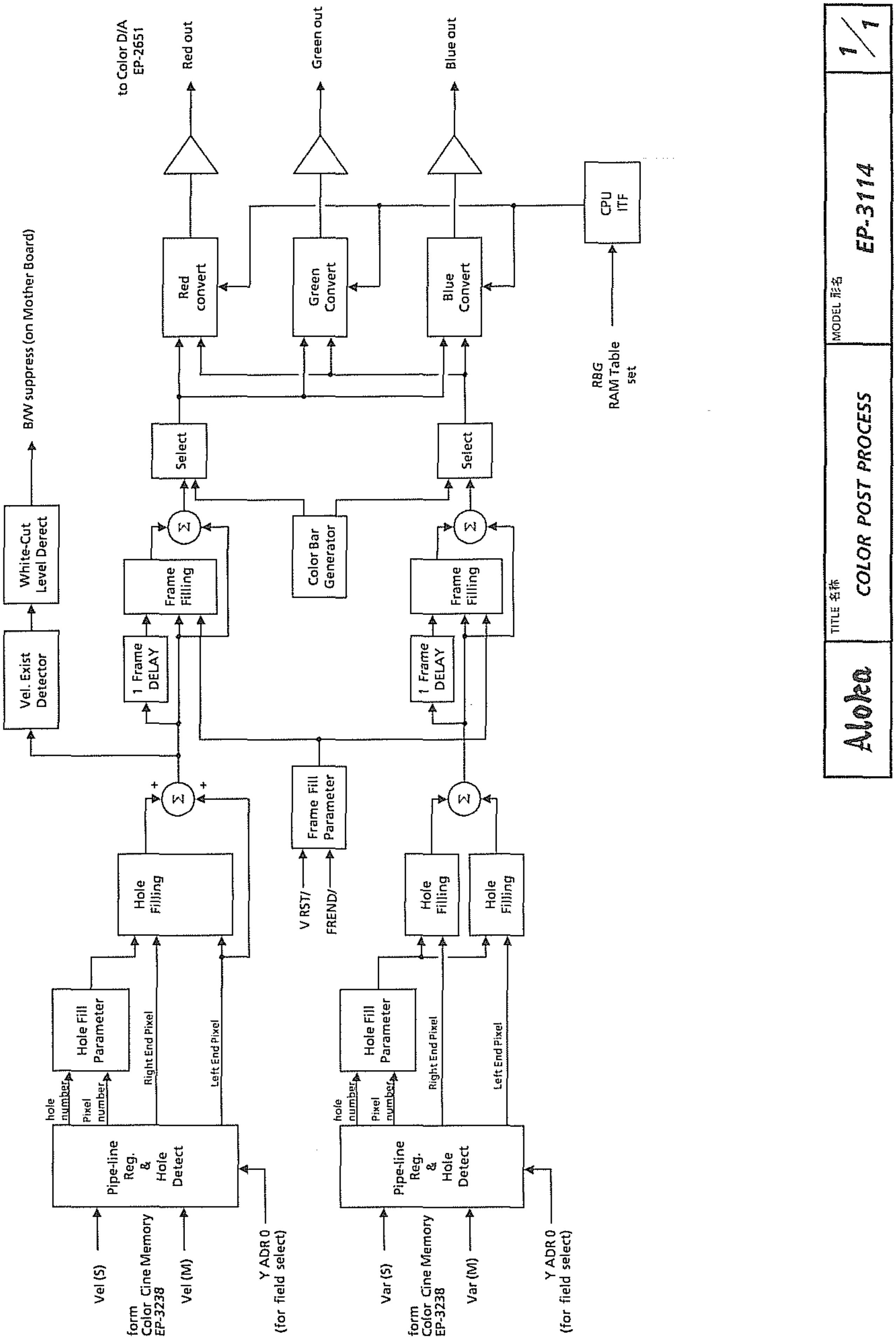
When a velocity exists and an echo level on the same pixel does not exceed a fixed value, the WHT-CUT function suppressed B/W(black and white) display to make the color display clear. The value of threshold for an echo level which suppressed B/W is set by the means of software. In this circuit, B/W suppression control signal is obtained from the comparator which detects the existence of the velocity signal and compares the echo level with the set value of threshold.

4) COLOR BAR SELECTION CIRCUIT

Smoothing is made for the two stages, upper and lower, of data in parallel with each other. Thereafter, either the upper or lower stage of data is selected for each field of TV display, and then changeover to output of the color-bar generator is made in time with color-bar display. The color-bar generator outputs data which causes linear variations of velocity and variance by countup of countdown of HD clock for velocity and 12 MHz clock for variance. Actual color bar is obtained by conversion of these signals into RGB.

5) RGB CONVERSION CIRCUIT (POST PROCESS FOR RGB)

This circuit is formed by the RAM which converts color data (velocity and variance) into RGB signals. Color correction data of RGB is previously transferred from the MPU to this RAM, so that the RAM outputs the RGB signals corresponding to the velocity and variance data which are input as address information to the RAM. Each RGB 8-bit signal is then sent to the COLOR D/A PCB where the RGB signal is converted into an analog signal.


Vel (S)
form Color Cine Memory EP-3238
Vel (M)
Y ADR 0 (for field select)
Pipe-line Reg. & Hole Detect
hole number
Pixel number
Hole Fill Parameter
Right End Pixel
Left End Pixel
Hole Filling
Σ
+
+
Vel. Exist Detector
White-Cut Level Derect
B/W suppress (on Mother Board)
1 Frame DELAY
Frame Filling
Σ
Select
Var (S)
form Color Cine Memory EP-3238
Var (M)
Y ADR 0 (for field select)
Pipe-line Reg. & Hole Detect
hole number
Pixel number
Hole Fill Parameter
Right End Pixel
Left End Pixel
Hole Filling
Hole Filling
Σ
1 Frame DELAY
Frame Filling
Σ
Select
V RST/
FREND/
Frame Fill Parameter
Color Bar Generator
Red convert
Green Convert
Blue Convert
CPU ITF
RBG RAM Table set
Red out
Green out
Blue out
to Color D/A EP-2651
Aloka
TITLE 名称
COLOR POST PROCESS
MODEL 形名
EP-3114
1/1

16-26 EP-2213 COLOR MEMORY VEL / COLOR MEMORY VAR

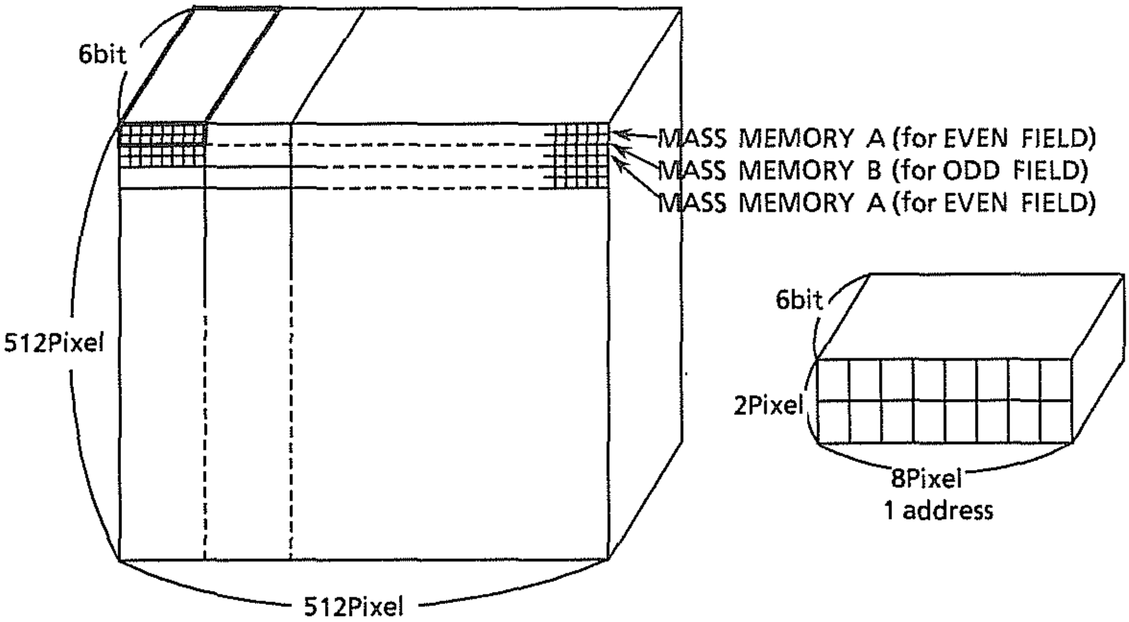
1. General

Two PCBs -- one for velocity (V) data and the other for Variance (δ) data -- are used. Each memory has the capacity large enough to store the whole area of ultrasound tomography image (512 pixels×512 pixels×6 bits). Velocity data is 6bit, however Variance data is 4 bit. Therefore on EP-2213*-1, for Variance, unnecessary D-RAMs are not mounted.

2. Operation

The mass memory consists of 32 chips of D-RAM ICs. The half of them (16 chips) have charge of 4 bits (0-3) and the remainder (16 chips) have charge of 2 bits (4 and 5) among 16 bits for gray-scale stages. (The remainder having charge of 2 bits is not in use.)

The arrangement of the memory is shown in the below figure. Eight chips are arranged in the horizontal-scanning direction and two chips are in the vertical direction, so that total 16 pixels are included in one address.


6bit
MASS MEMORY A (for EVEN FIELD)
MASS MEMORY B (for ODD FIELD)
MASS MEMORY A (for EVEN FIELD)
512Pixel
512Pixel
6bit
2Pixel
8Pixel
1 address

Memory Capacity

Therefore, the whole tomography image is composed of 64 addresses in the horizontal direction and 256 addresses in the vertical direction.

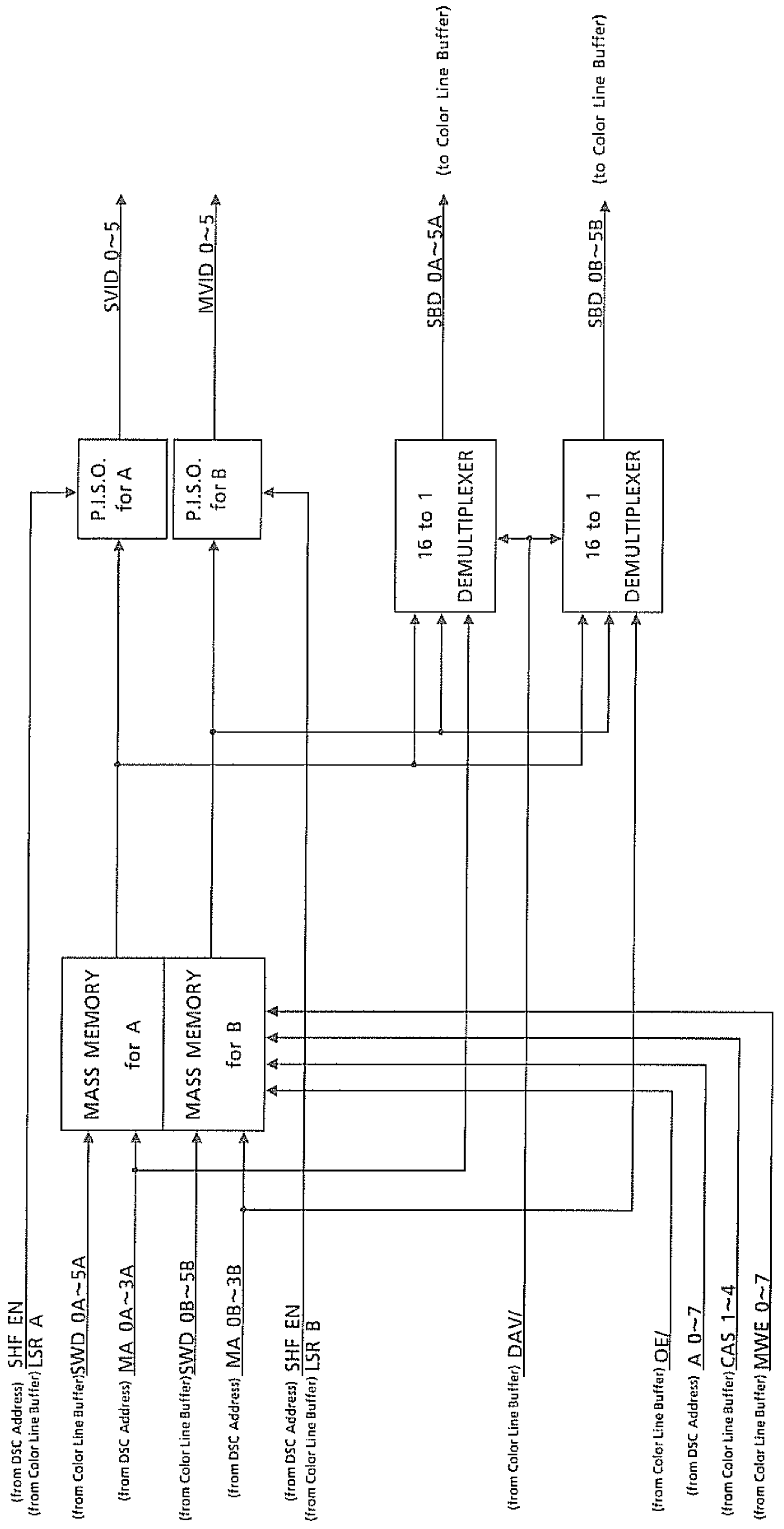
1) Writing in to memory (READ MODIFY WRITE)

To perform frame correlation, the mass memory operates in the RMW (Read Modify Write) cycle. To increase writing speed, access to two pixels in the same address is made simultaneously and writing of those two pixels is also made simultaneously.

2) Reading out from memory (PARALLEL READ)

To display data on the TV monitor, 16-pixel data (one pixel on each RAM chip) are read out from 16 RAM chips simultaneously for one address use.

The READ MODIFY WRITE cycle and the PARALLEL READ cycle are repeated alternately.


(from DSC Address) SHF EN
(from Color Line Buffer) LSR A
(from Color Line Buffer) SWD 0A~5A
(from DSC Address) MA 0A~3A
(from Color Line Buffer) SWD 0B~5B
(from DSC Address) MA 0B~3B
(from DSC Address) SHF EN
(from Color Line Buffer) LSR B
(from Color Line Buffer) DAV/
(from Color Line Buffer) OE/
(from DSC Address) A 0~7
(from Color Line Buffer) CAS 1~4
(from Color Line Buffer) MWE 0~7
MASS MEMORY for A
MASS MEMORY for B
P.I.S.O. for A
P.I.S.O. for B
16 to 1 DEMULTIPLEXER
16 to 1 DEMULTIPLEXER
SVID 0~5
MVID 0~5
SBD 0A~5A
(to Color Line Buffer)
SBD 0B~5B
(to Color Line Buffer)

EP-2213* : for Velocity
EP-2213*-1 : for Variance

Aloka	TITLE 名称 COLOR MEMORY VEL COLOR MEMORY VAR	MODEL 形名 EP-2213 EP-2213 -1	1/1

16-27 EP-3238 COLOR CINE MEMORY

1. General

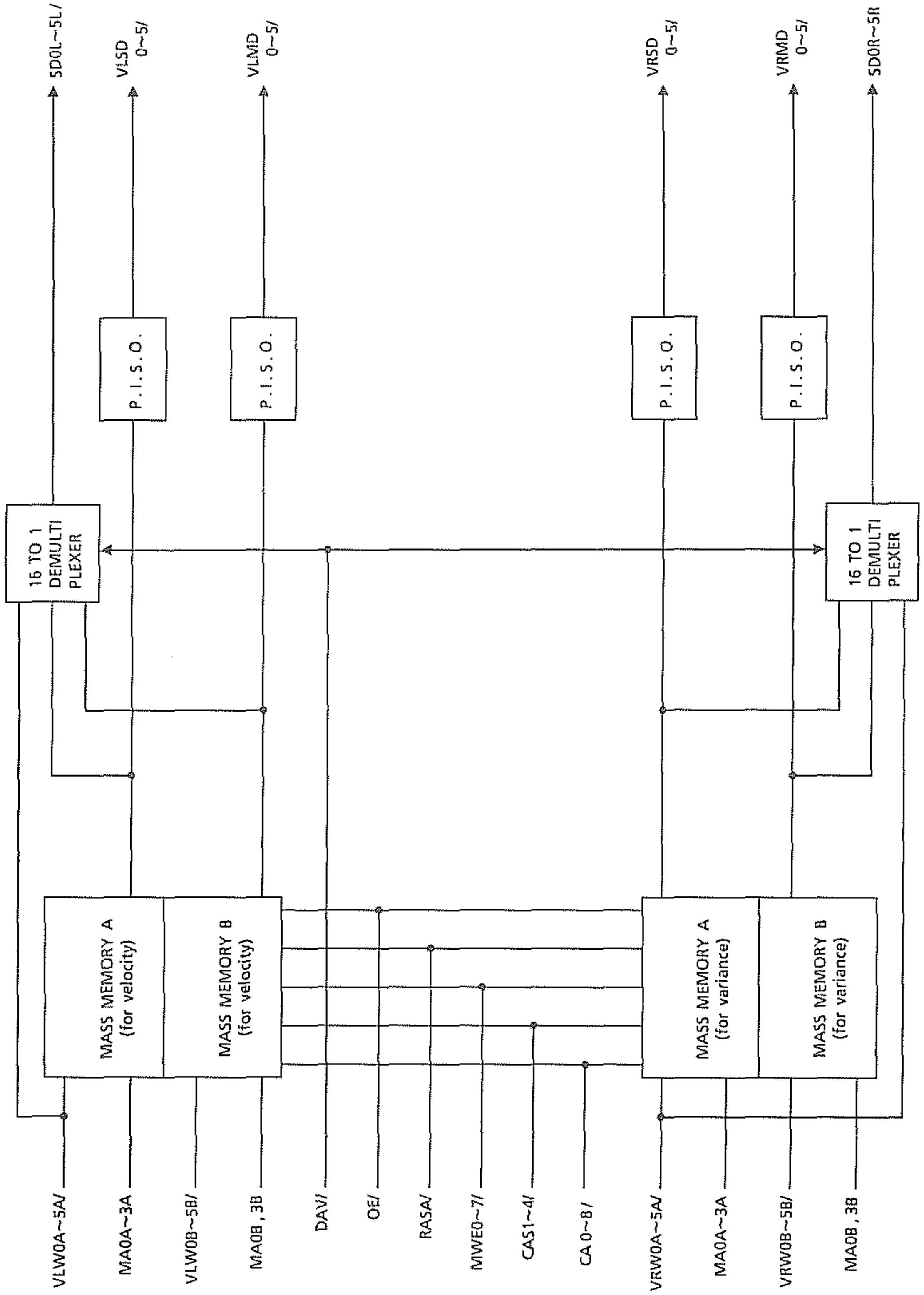
   This PCB has Cine memory for both velocity and variance. The memory capacity is 512pixels × 512pixels × 6bits × 16planes for velocity, and 512pixels × 512pixels × 4bits × 16planes for variance. Writing of data, similar to that of Color memory , is made on the planes in order.

2. Operetion

   The Cine memory for velocity consists of 32 D-RAM ICs, a half of which, 16 ICs. being in charge of 4 bits of 6-bit data, while the other 16 ICs. of 2 bits. (The remainder, 2 bits, is not in use.)

   And the Cine memory for variance consists of 16 D-RAM ICs. (The variance is 4-bit data)

   The address formation of memories and the memory operation (writing and readout) are similar to those of EP-3237 (B/W CINE MEMORY) .


SD0L~5L/
VLSD 0~5/
VLMD 0~5/
VRSD 0~5/
VRMD 0~5/
SD0R~5R
P.I.S.O.
P.I.S.O.
P.I.S.O.
P.I.S.O.
16 TO 1 DEMULTI PLEXER
16 TO 1 DEMULTI PLEXER
MASS MEMORY A (for velocity)
MASS MEMORY B (for velocity)
MASS MEMORY A (for variance)
MASS MEMORY B (for variance)
VLW0A~5A/
MA0A~3A
VLW0B~5B/
MA0B , 3B
DAV/
OE/
RASA/
MWE0~7/
CAS1~4/
CA 0~8/
VRW0A~5A/
MA0A~3A
VRW0B~5B/
MA0B , 3B

Aloka

TITLE 名称 COLOR CINE MEMORY

MODEL 形名 EP-3238

1/1

16-28 EP-3443 VIDEO ITF

1. *General*

   This PCB consists of the video distributor, encoder and decoder. The encoder converts the RGB signal into the PAL or NTSC video signal, while the decoder converts the PAL or NTSC video signal into the RGB signal.

2. Principle of operation

   1) VIDEO DISTRIBUTOR

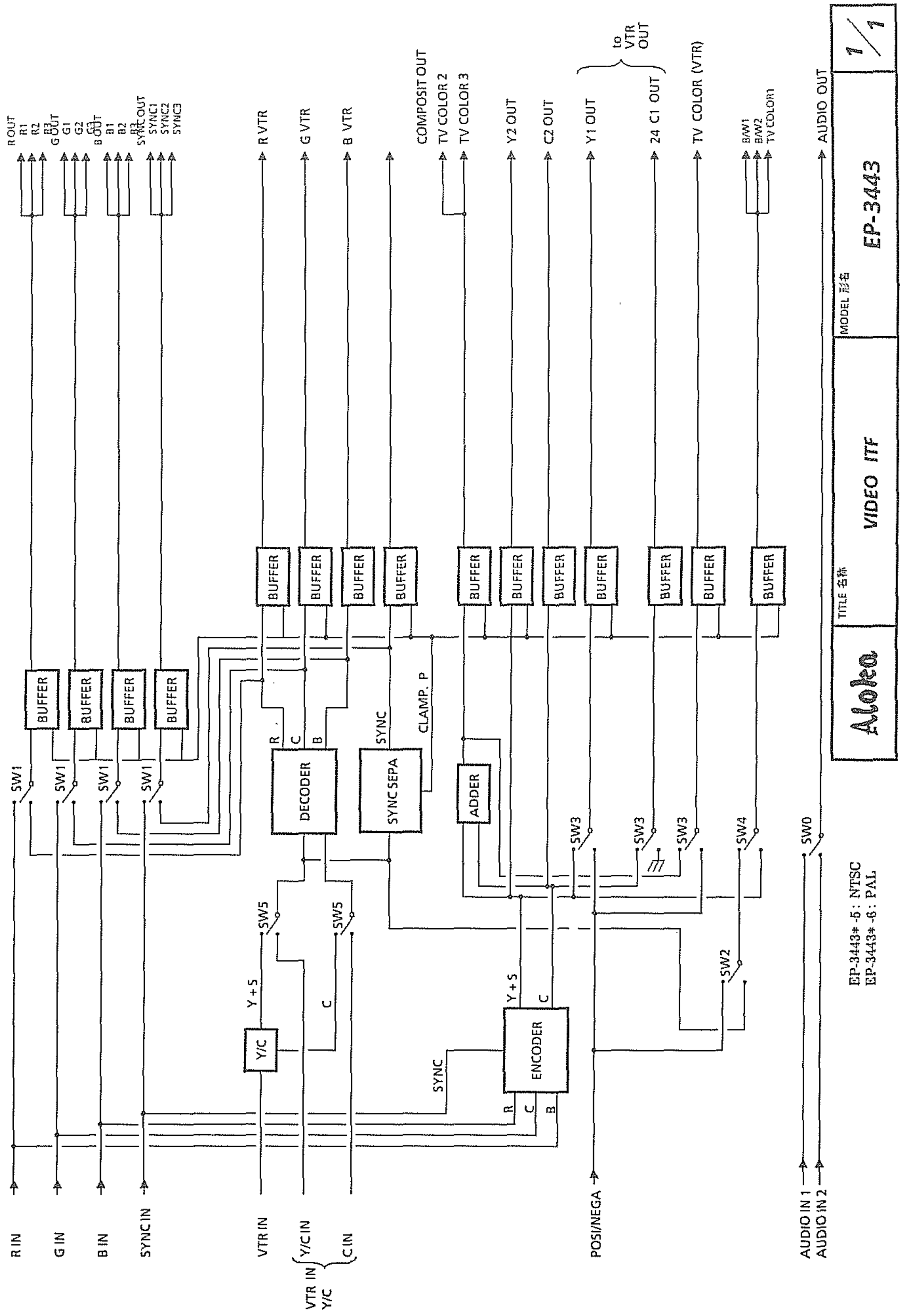
      Consists of many relays and buffers and selects video signals to be distributed to the respective units.

   2) ENCODER

      Converts the RGB signal flowing in a circuit into the PAL or NTSC video signal necessary for the connected VCR.

   3) DECODER

      Converts the PAL or NTSC video signal which the VCR outputs into the RGB signal necessary for the connected VCR.


R IN
G IN
B IN
SYNC IN
VTR IN
Y/C IN
C IN
VTR IN Y/C
POSI/NEGA
AUDIO IN 1
AUDIO IN 2
SW1
SW1
SW1
SW1
BUFFER
DECODER
SYNC SEPA
Y/C
Y + 5
C
SW5
SW5
R
C
B
SYNC
CLAMP. P
ENCODER
SYNC
ADDER
SW3
SW3
SW3
SW4
SW2
SW0
R OUT
R1
R2
R3
G OUT
G1
G2
G3
B OUT
B1
B2
B3
SYNC OUT
SYNC1
SYNC2
SYNC3
R VTR
G VTR
B VTR
COMPOSIT OUT
TV COLOR 2
TV COLOR 3
Y2 OUT
C2 OUT
Y1 OUT
24 C1 OUT
to VTR OUT
TV COLOR (VTR)
B/W1
B/W2
TV COLOR1
AUDIO OUT
Aloka
TITLE 名称
VIDEO ITF
MODEL 形名
EP-3443
1/1

EP-3443*-5 : NTSC
EP-3443*-6 : PAL

16-29 EP-3260 DOP TXRX

1. Signal list

Input signals

Tx+/Tx− : Probe transmission signal (Differential type)
Rx+/Rx− : Probe receiving signal (Differential type)
Xcos : Transmission original signal
XMIT : Signal for determining the burst length of transmission pulse wave
COS/SIN : Reference signal which inputs to the mixer
CWRELAY : Signal for controlling the PW/CW changeover relay
VTXIN : Control signal for setting the transmission voltage
TEST : Signal for turning on/off the test signal generator
TESTTYPE : Signal for selecting the type of test signal
MATCH : Signal for determining the width of range gate
DSAMPLE : Signal for sampling the output of integrator
RESET : Signal for resetting the integrator
SD4 : Serial control data

Output signals

Tx+/Tx− : Probe transmission signal (Differential type)
Rx+/Rx− : Probe receiving signal (Differential type)
HPA, HPB : Doppler shift echo after passing through the Walsh transform filter

State setting signal (Serial control data)

FSEL (4 bits) : Selects the tank circuit.
MACHI GAIN (4 bits) : Determines the time constant of integrator.(PW operation mode)
Determines the value of voltage gain (CW operation mode)
HPFREQ (8 bits) : Determines the cutoff frequency of the high pass filter.

2. Flow of signals

In this equipment, transmission and receiving are possible in both the PW and CW operation modes. In the case of CW operation mode, one of two probes is used for transmission only and the other for receiving only. In the PW operation mode, each probe is used for both transmission and receiving at the same time.

The received echo signal is subjected to a band limitation while it passes through a band pass filter. Since four kinds of filters are mounted, frequency usable for doppler measurement depends on what filter is selected. Selection of one of four filters is made by serial control data "FSLE."

After passing through a filter, the signal is divided by orthogonal transform detection into two lines. In the case of PW operation mode, a range gate is applied to a signal of the aimed part and the signal in the gate is held by integration. Here, the serial control data "MATCH GAIN" determines integration time constant. In the case of CW operation mode, no range gate is used and no integration is made. Here, the above-mentioned "MATCH GAIN" determines only the gain

The below Fig. shows a time chart for PW operation mode. The signal finally passes through the high pass filter (HPF) which eliminates signals from slow-movement parts in the human body such as blood vessels. The HPF is formed by the switched resistor filter (SRF) and control data HPFREQ specified cutoff frequency of the HPF.

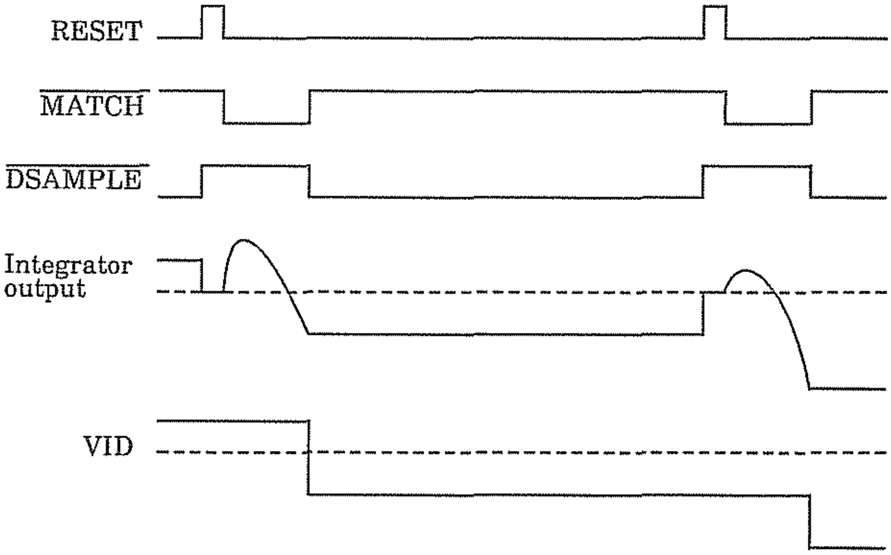
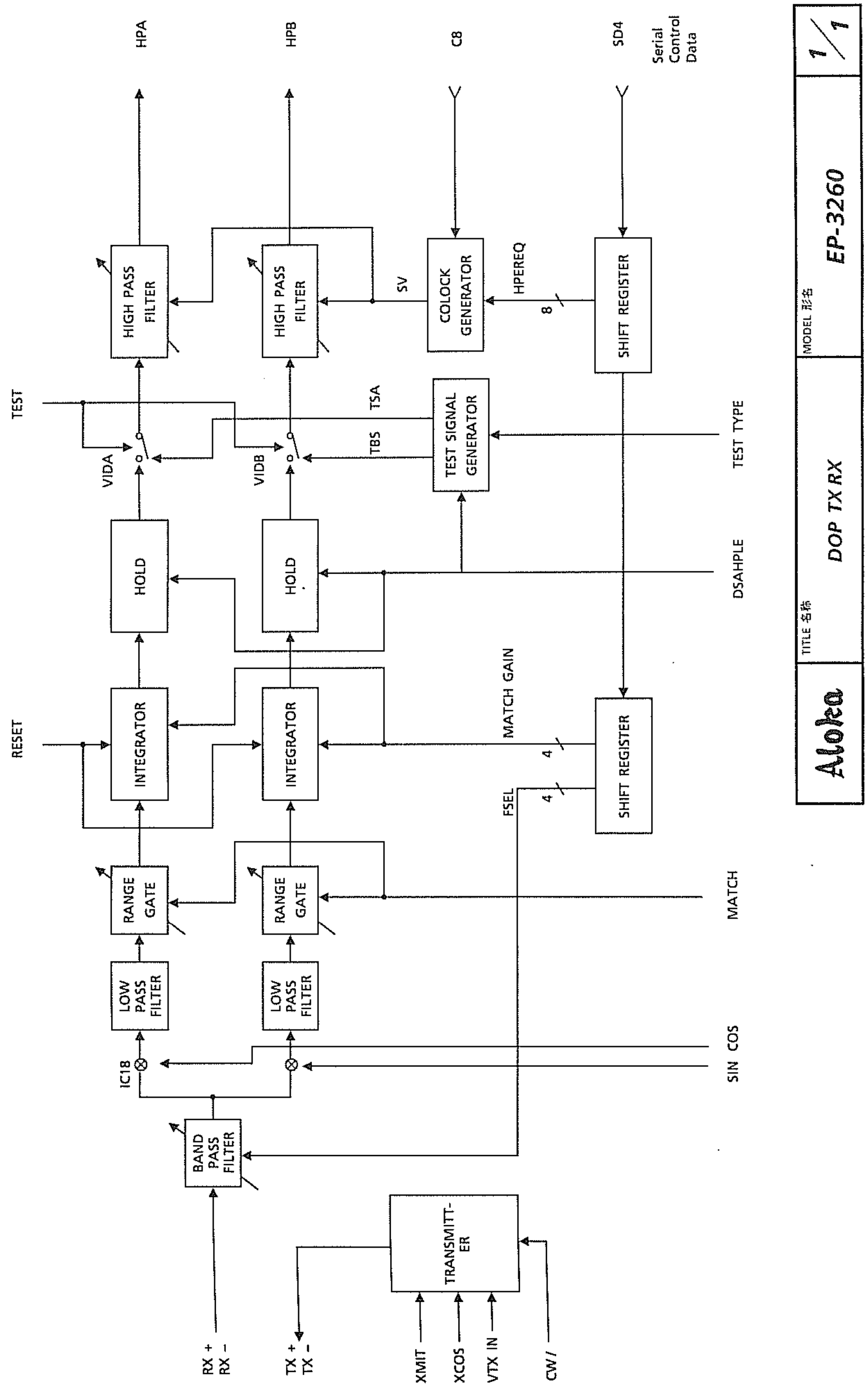


Fig. Range gate and Sample and Hold


HPA
HPB
C8
SD4
Serial Control Data
HIGH PASS FILTER
HIGH PASS FILTER
SV
COLOCK GENERATOR
HPEREQ
8
SHIFT REGISTER
TEST
TSA
TBS
TEST SIGNAL GENERATOR
TEST TYPE
VIDA
VIDB
HOLD
HOLD
DSAHPLE
RESET
INTEGRATOR
INTEGRATOR
MATCH GAIN
4
4
FSEL
SHIFT REGISTER
RANGE GATE
RANGE GATE
MATCH
LOW PASS FILTER
LOW PASS FILTER
IC18
SIN COS
BAND PASS FILTER
TRANSMITT-ER
RX +
RX –
TX +
TX –
XMIT
XCOS
VTX IN
CW /
Aloka
TITLE 名称
DOP TX RX
MODEL 形名
EP-3260
1/1

16-30 EP-2810 DOP CONTROLLER

1. General

This PCB consists of the MPU and its peripheral circuit, and various timing generating circuits

2. Operation

1. MPU AND ITS PERIPHERAL CIRCUIT

1-1 MPU

The MPU performs various kinds of operation and control.

1-2 RANDOM ACCESS MEMORY

The read/write memory for temporary storage of operational data.

1-3 READ ONLY MEMORY

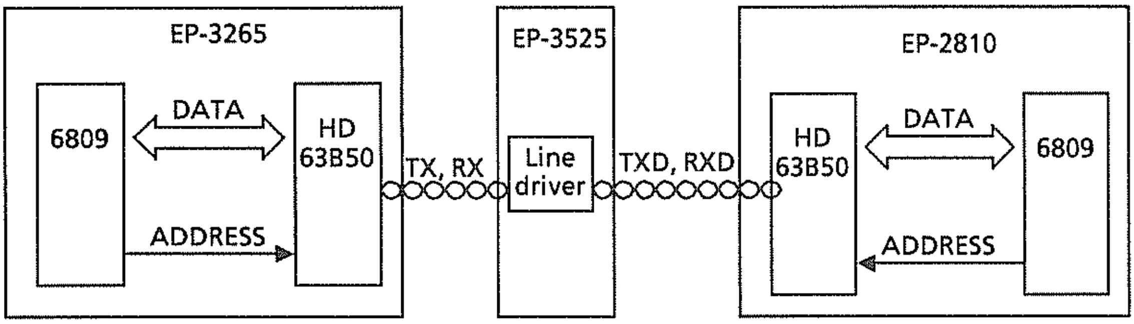
The memory for storing the control program which controls the CPU.

1-4 ASYNCHRONOUS COMMUNICATION INTERFACE ADAPTER (ACIA)

This adapter is use for communication with the host. The transfer method is of the serial link type.

1-5 VERSATILE INTERFACE ADAPTER (VIA)

Gives the communication clock to the ACIA and outputs the serial control data necessary for controlling the circuit in the unit (DM-5).



Communication with host

2. VARIOUS TIMING GENERATING CIRCUITS

Those circuits are roughly classified as the (CW) transmission voltage control circuit, the (CW) transmission signal generating circuit, the system clock generating circuit, and the doppler-signal image processing control signal generating circuit.

2-1 TRANSMISSION VOLTAGE CONTROL CIRCUIT

Serial data from the MPU is converted by the shift register into 8-bit parallel data, which is converted by the D/A converter into analog data which is sent to the Tx & Rx PCB.

2-2 Quadrature detector and Transmission signal generating circuit

Signals of 40 MHz (for 5 MHz) and 56 MHz (for 3.5 MHz and 7 MHz) from the host are divided into N by the frequency divider to output a frequency suited to the probe. Two lines of signals different 90 °C in phase from each other are used for Quadrature detector.

2-3 SYSTEM CLOCK GENERATING CIRCUIT

Signals of 40 MHz and 56 MHz are frequency divided into N to form the clock waveform of 8 MHz. This signal serves as the basic clock of the system.

2-4 Doppler-signal image processing control signal generating circuit

This circuit generates the following control signals:

Clock which determines cutoff frequency of LPF in FILTER PCB (EP-3259) →LPCLK

Signal for sampling the output of integrator in Tx & Rx PCB (EP-3260) →DSAMPLE

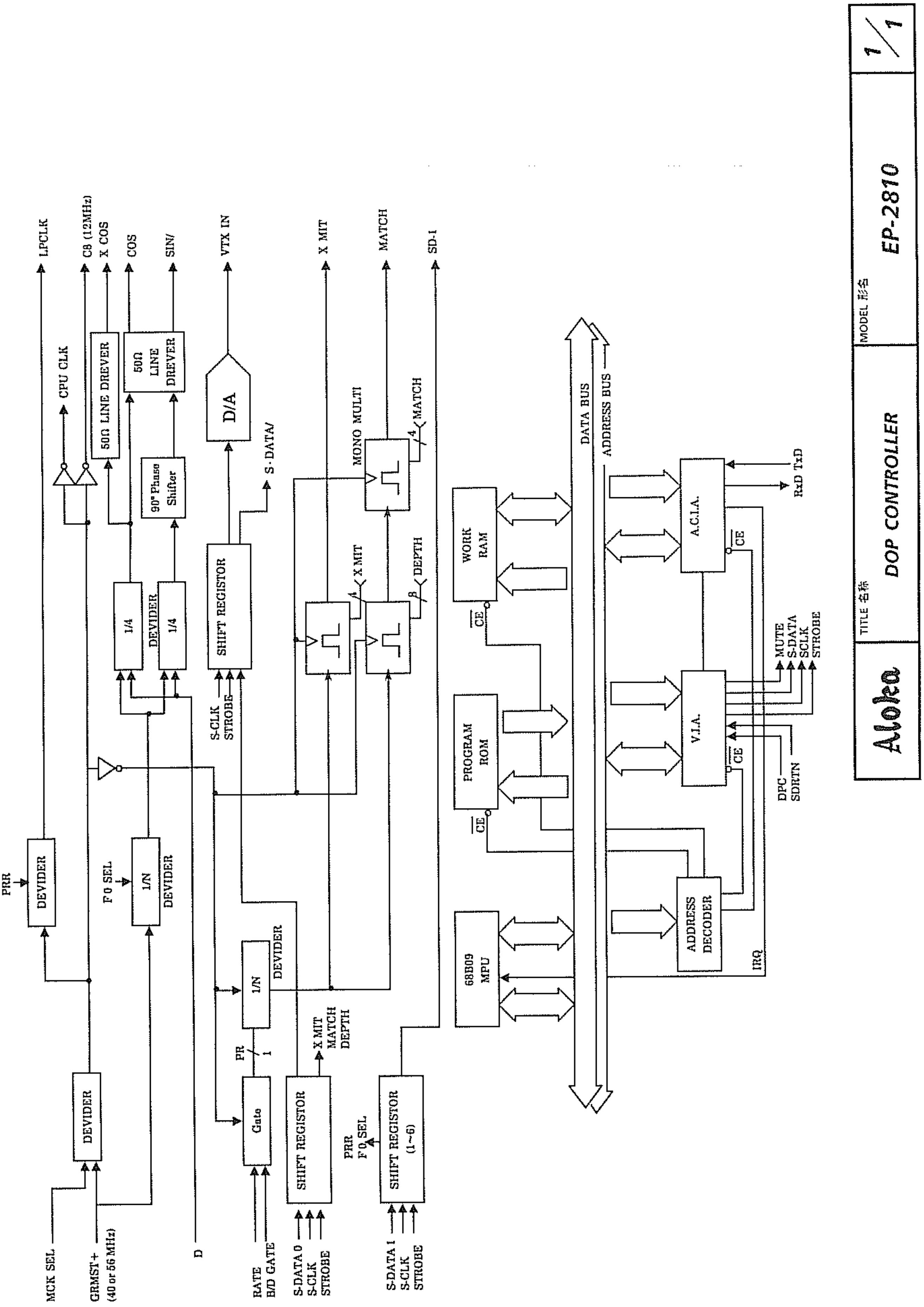
Signal for resetting the integrator in Tx & Rx PCB (EP-3260) →RST

Signal which determines the width of range gate in Tx & Rx PCB (EP-3260) →MATCH

Gate signal which determines pulse width of transmission pulse signal →XMIT

Signal for controlling the PW/CW selector relay in Tx & Rx PCB (EP-3260) →CW RELAY

To output those signals, serial data from the MPU are converted into parallel data by the shift register.


Aloka
TITLE 名称
DOP CONTROLLER
MODEL 形名
EP-2810
1/1
LPCLK
C8 (12MHz)
X COS
COS
SIN/
VTX IN
X MIT
MATCH
SD-1
CPU CLK
50Ω LINE DREVER
50Ω LINE DREVER
90° Phase Shifter
D/A
S-DATA/
MONO MULTI
4
MATCH
X MIT
A
DEPTH
B
1/4
DEVIDER
1/4
SHIFT REGISTOR
S-CLK
STROBE
DATA BUS
ADDRESS BUS
WORK RAM
CE
PROGRAM ROM
CE
68B09 MPU
A.C.I.A.
CE
RxD TxD
V.I.A.
CE
MUTE
S-DATA
SCLK
STROBE
DPC
SDRTN
ADDRESS DECODER
IRQ
PRR
DEVIDER
F0 SEL
1/N
DEVIDER
DEVIDER
1/N
DEVIDER
PR
1
Gate
SHIFT REGISTOR
X MIT
MATCH
DEPTH
PRR
F0 SEL
SHIFT REGISTOR (1~6)
MCK SEL
GRMST+ (40 or 56 MHz)
D
RATE
B/D GATE
S-DATA 0
S-CLK
STROBE
S-DATA 1
S-CLK
STROBE

16-31 EP-3259 DOP FILTER

This PCB has the following four functions :

(1) Serves as the Low Pass Filter circuit to increase the S/N ratio of doppler signals.

(2) Serves as the AA Filter (Anti-Allasing Filter) circuit which previously provides a limitation of band to prevent folding at the analysis part.

(3) Serves as the AGC (Automatic Gain Control) circuit to expand the dynamic range of input to the analysis part.

(4) Serves as the ring buffer memory to transfer data to be analyzed timely to the analysis part.

1. Signal list

Input signals

HPA/HPB	:	Complex doppler signal passed through the High Pass Filter
RPLYA/RPLYB	:	External input audio signal. The signal is input when only the analysis part is used
LPCLK	:	Clock signal which controls the cutoff frequency of the Low Pass Filter
SD3	:	Serial data transferred from the CPU

Output signals

MD0~7	:	Output signal to the analysis part. A doppler signal to beanalyzed and a level signal which determines the rejection level are transferred by time division.

Internal signals

LPGAIN 0.1	:	Signal for controlling the gain of a signal to be analyzed or for switching over to an external input signal
LOWC1	:	Signal for controlling the cutoff frequency of AA Filter. It doubles the cutoff frequency of the filter in the case of base-line shift.
AA CLK	:	Clock signal of the AA Filter
AA FREQ	:	Preset value of the counter which determines sampling frequency of the analysis part
SYN SAMPLE	:	Sampling signal for frequency analysis.
MUX A/B	:	Switching signal which transfers crossed doppler signal to the AGC circuit by time division
REJECT LEVEL	:	Signal which determines the rejection level of spectrum indication
SPGAIN	:	Signal which determines the gain to a small signal
SSAMPLE	:	Trigger signal for sampling for the frequency analysis part
SC. OE	:	Signal for determining timing of AD conversion of doppler signal (SC) and signal for determining timing of data transfer to the ring buffer memory (OE)
GAIN EN	:	Signal for setting AGC gain
R/W	:	Timing signal for write/read of the ring buffer memory.

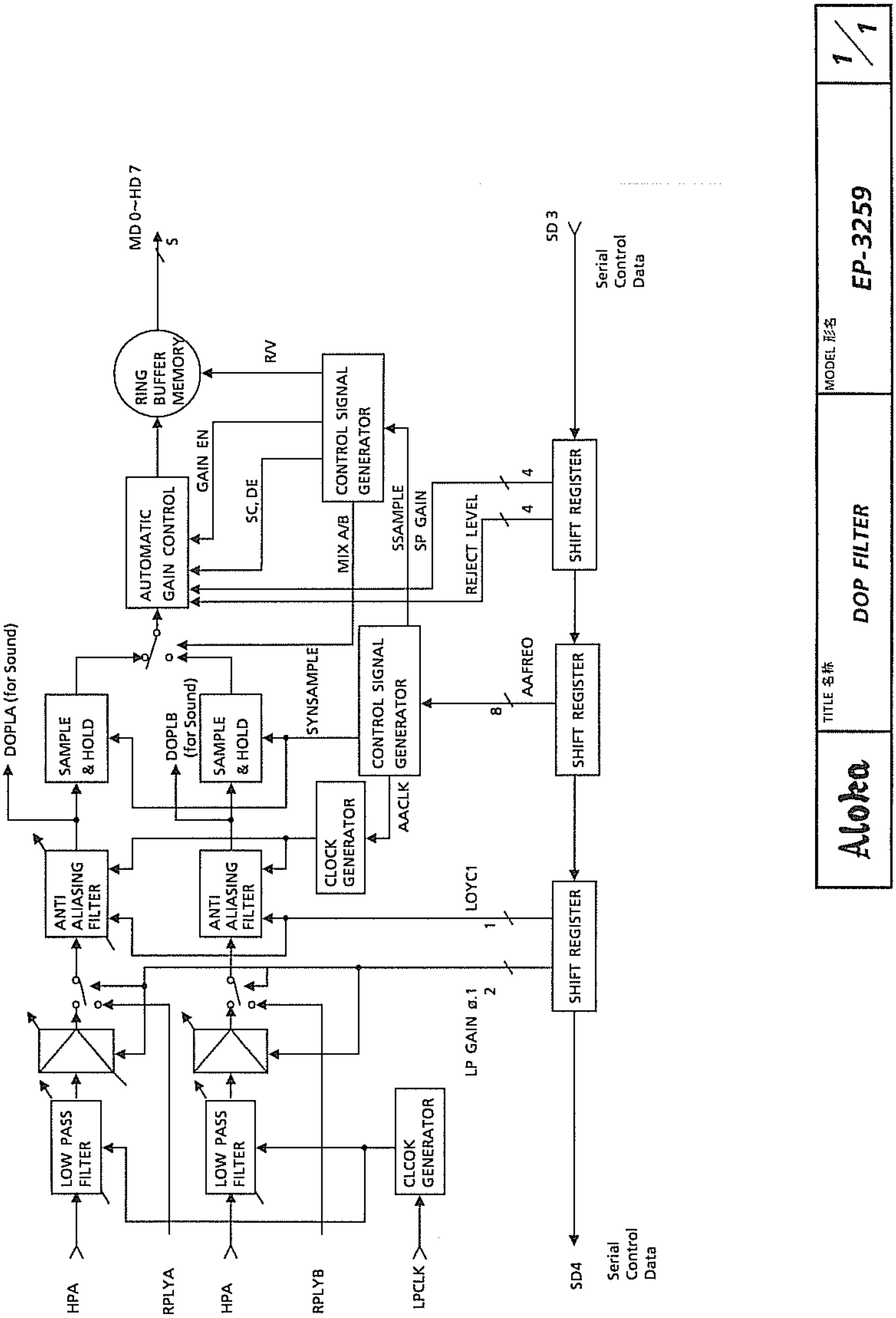
2. Flow of signals

The complex doppler signal (HPA/HPB) in which two signals are 90° different in phase from each other is first input into LPF. During PW operation, the LPE has the pass band width which is a half of transmission pulse repetition frequency PRF (PRF/2), and is able to remove the high-frequency component of the doppler signal, caused by the sample-hold circuit in the Tx-and-Rx PCB, and white noise of background. During CW operation, cutoff frequency of the LPF is fixed to 20 KHz.

Then, output signal from the LPF is connected through ATT to the external input signal changeover switch. The part succeeding to this switch is considered the substantial signal analysis part.

To prevent aliasing, which is caused by sampling of input signal, a previous band limitation must be applied to the input signal. The necessary band limitation is made by the AA Filter whose cutoff frequency is set to a half of the frequency of SSAMPLE signal.

After passing through the AA Filter, the signal to be analyzed is maintained at a constant sample-hold circuit output, divided into time-division signals, and then transferred to the AGC circuit.


HPA
RPLYA
HPA
RPLYB
LPCLK
LOW PASS FILTER
LOW PASS FILTER
CLCOK GENERATOR
ANTI ALIASING FILTER
ANTI ALIASING FILTER
CLOCK GENERATOR
SAMPLE & HOLD
SAMPLE & HOLD
DOPLA (for Sound)
DOPLB (for Sound)
SYNSAMPLE
CONTROL SIGNAL GENERATOR
AACLK
AUTOMATIC GAIN CONTROL
RING BUFFER MEMORY
MD 0~HD 7
5
GAIN EN
SC, DE
MIX A/B
R/V
CONTROL SIGNAL GENERATOR
SSAMPLE
SP GAIN
REJECT LEVEL
4
4
AAFREQ
8
LOYC1
1
LP GAIN α.1
2
SHIFT REGISTER
SHIFT REGISTER
SHIFT REGISTER
SD 3
Serial Control Data
SD4
Serial Control Data
Aloka
TITLE 名称
DOP FILTER
MODEL 形名
EP-3259
1/1

16-32 EP-2812 DOP INTERFACE

1. Signal list

Input signals

SP VID 0/~6/	Spectrum data sent from the frequency analysis part.
TR PPM/	Analog trace signal sent from the frequency analysis part.
UNBLS	Unblanking signal for spectrum (Disabling output)
UNBLT	Unblanking signal for trace (Disabling output)
DOT CLK	Clock for reading out spectrum/trace data
48 MHz/	Master clock (48 MHz) disabling signal
SDI	Serial control data for condition setting
TxD/	Serial control data for condition setting
RPLY A	Doppler sound (from VTR) reproduction signal
RPLY B	Doppler sound (from VTR) reproduction signal

Output signals

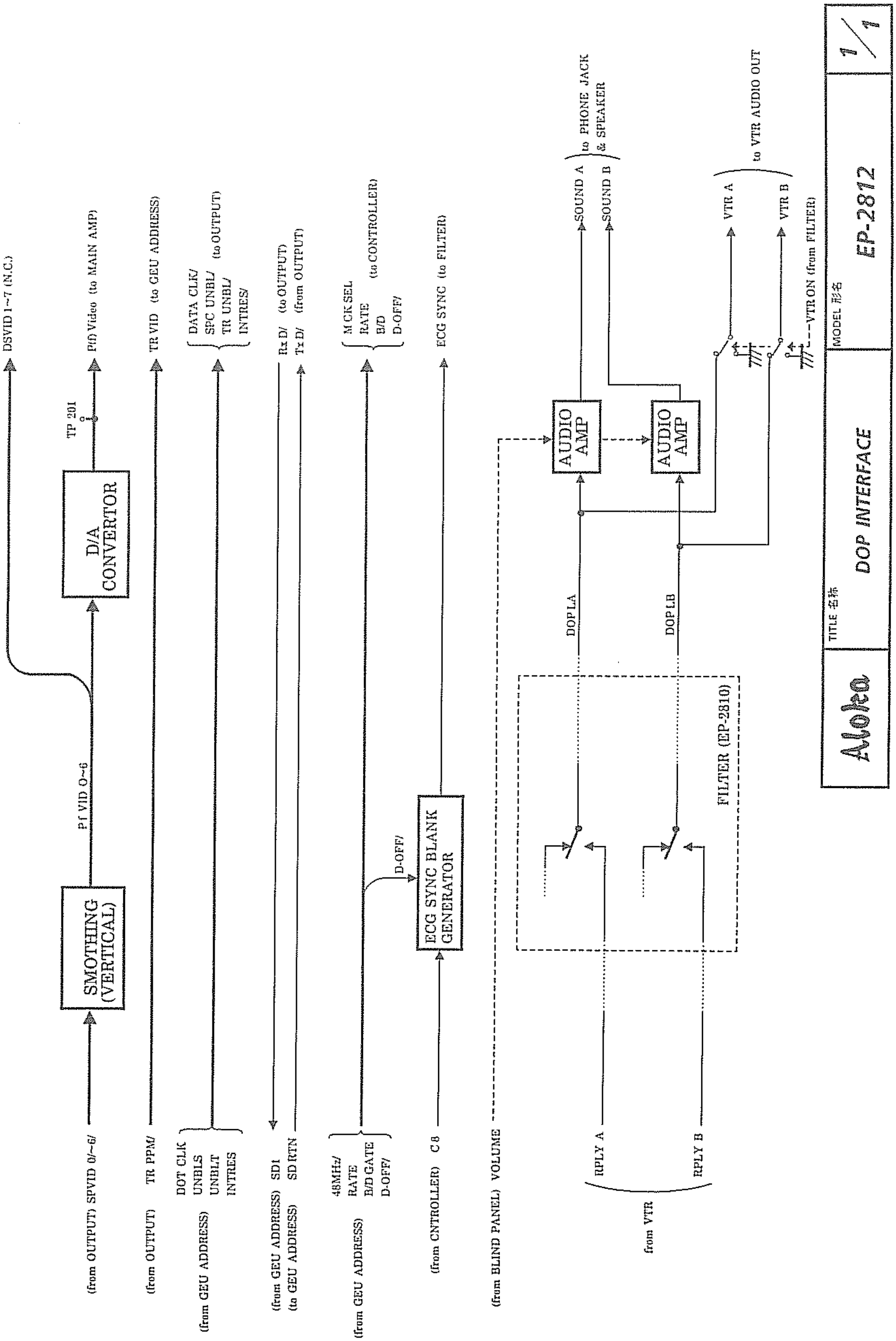
P(f) Video	Spectrum signal
TR VID	Analog trace signal (PPM)
SOUND A	Doppler signal
SOUND B	Doppler signal
SD RTN	Serial control data for condition setting
RxD/	Serial control data for condition setting

2. Flow of signals

128-point spectrum data (SPVID 0/~6/) from the frequency analysis part pass through the smoothing circuit in the vertical direction (frequency-axis direction) and, after converted into analog signal (P(f) Video), flow to the GEU unit.

The PPM signal for analog trace display use is also sent out from the frequency analysis part and it flows through this PCB to the CEU unit.

Doppler sound signals from the Filter PCB are output to the speaker and VTR.


(from OUTPUT) SPVID 0/~6/
SMOTHING (VERTICAL)
P f VID 0~6
D/A CONVERTOR
TP 201
P(f) Video (to MAIN AMP)
DSVID 1~7 (N.C.)
(from OUTPUT) TR PPM/
TR VID (to GEU ADDRESS)
(from GEU ADDRESS) DOT CLK UNBLS UNBLT INTRES
DATA CLK/ SPC UNBL/ TR UNBL/ INTRES/ (to OUTPUT)
(from GEU ADDRESS) SD1
(to GEU ADDRESS) SD RTN
Rx D/ (to OUTPUT)
Tx D/ (from OUTPUT)
(from GEU ADDRESS) 48MHz/ RATE B/D GATE D-OFF/
M CK SEL RATE B/D D-OFF/ (to CONTROLLER)
D-OFF/
(from CNTROLLER) C8
ECG SYNC BLANK GENERATOR
ECG SYNC (to FILTER)
(from BLIND PANEL) VOLUME
AUDIO AMP
AUDIO AMP
SOUND A
SOUND B
to PHONE JACK & SPEAKER
VTR A
VTR B
to VTR AUDIO OUT
VTR ON (from FILTER)
DOP LA
DOP LB
FILTER (EP-2810)
RPLY A
RPLY B
from VTR
Aloka
TITLE 名称
DOP INTERFACE
MODEL 形名
EP-2812
1/1

16-33 FFT PCB

1. General

The frequency analyzer (NJK-196A) consists of the FFT PCB and OUTPUT PCB.

To increase the speed of processing, the frequency analyzer uses four DSPs (Digital signal Processors) for FFT operation (by two DSPs), power operation, and trace operation, respectively. Overall processing time is about 5 ms and the result is updated every about 2.3 ms by pipeline control. Furthermore, interpolation control can be made to increase apparent speed.

This FFT PCB performs FFT operation and power operation.

2. Operation

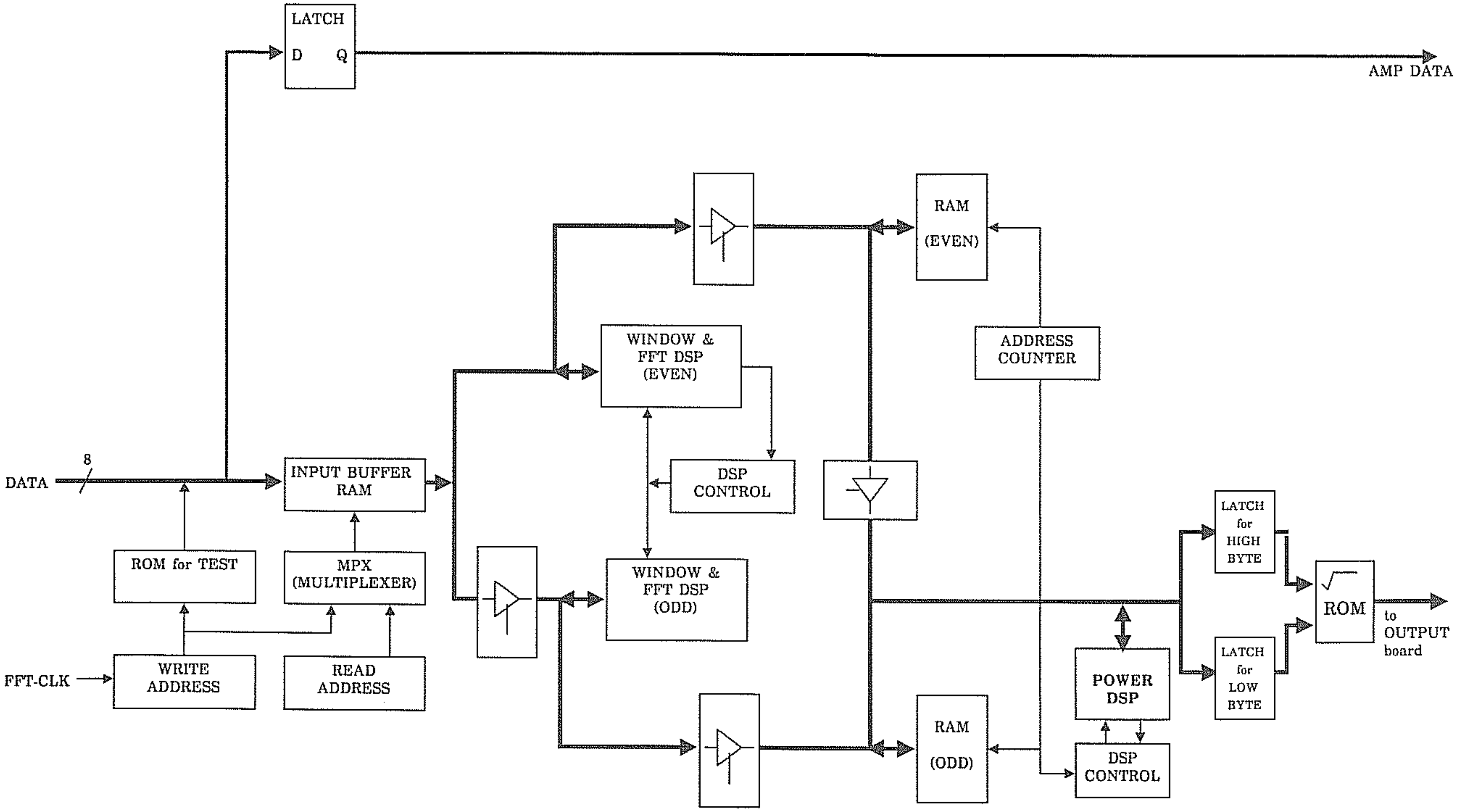
1) FFT OPERATION

The input buffer RAM stores the real-number data and imaginary-number data alternately each time of arrival of data. For each operational cycle, the DSP for FFT takes 128 data, from the buffer RAM data of 128 samples before to the data of up to date, in to the internal RAM. There are two DSPs for FFT; one stores even-number data and the other stores odd-number data. In each DSP, 6-stage FFT operation is made with application of Hanning window. After operation, the result is outputted to the RAMs (a RAM for even-number use and the other for odd-number use).

Then, the DSP sends an interrupt signal to the power operation DSP to inform it of *the end of outputting* data.

2) POWER OPERATION

The power operation DSP performs butterfly operation for the FFT final stage of 128-point complex data, alternately taking data from the even-number RAM and odd-number RAM. Then, the DSP calculates "| Real number |+| Imaginary number |" and outputs the result. 16-bit data is compressed to 8-bit data through extraction of square root by the √ROM and is transferred to the trace operation RAM. Although this DSP is called the POWER OPERATION DSP, it does not perform "power operation," but calculates the sum of absolute values ad mentioned above.


LATCH
D
Q
AMP DATA
DATA
8
FFT-CLK
ROM for TEST
WRITE ADDRESS
INPUT BUFFER RAM
MPX (MULTIPLEXER)
READ ADDRESS
WINDOW & FFT DSP (EVEN)
DSP CONTROL
WINDOW & FFT DSP (ODD)
RAM (EVEN)
RAM (ODD)
ADDRESS COUNTER
POWER DSP
DSP CONTROL
LATCH for HIGH BYTE
LATCH for LOW BYTE
ROM
to OUTPUT board

Aloka	TITLE 名称 FFT Calculator	MODEL 形名 FFT (NJK-196A)	1/1

16-34 OUTPUT PCB

1. General

The FREQUENCY ANALYZER (NJK-196A) consists of the FFT PCB and OUTPUT PCB.

To increase the speed of processing, the frequency analyzer uses four DSPs (Digital Signal Processors) for FFT operation (by two DSPs), power operation, and trace operation, respectively. Overall processing time is about 5 ms and the result is updated every about 2.3 ms by pipeline control. Furthermore, interpolation control can be made to increase apparent speed.

This OUTPUT PCB performs trace operation, interpolation, and moving average processing.

2. Operation

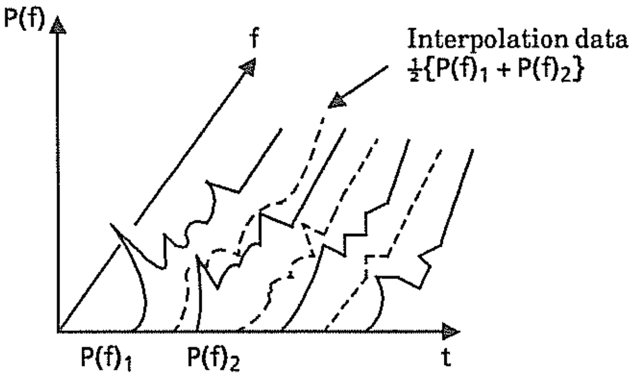
1) TRACE OPERATION

The trace DSP takes data in from the trace buffer RAM (1) and performs various TRACE operations. Because of limitation in capacity of the DSP internal RAM, taking data in and operation are made two times repeatedly. Accordingly, when the DSP takes data in from the buffer RAM (1), the data is transferred to the trace buffer RAM (2), too, to use the stored data for the second time of taking data in (and operation to be made at the same time).

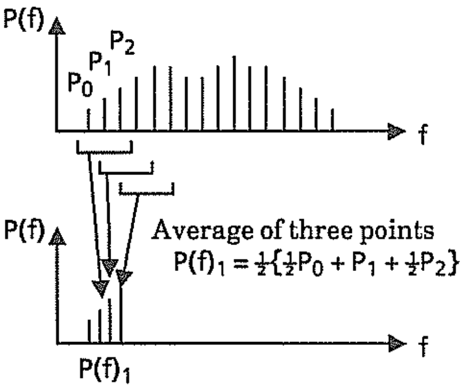
The base line shift, rejection, integrating scale information, and heart-beat timing, which are necessary for trace operation, are taken in through the serial port of DSP.

2) INTERPOLATION AND MOVING AVERAGE PROCESSING

In interpolation, data are interposed between 128 freguency data which are updated every about 2.3 ms so that results come out about every 1.1 ms apparently. The moving average processing averages three consecutive data on the frequency axis to get the mean-value data. This process is applied to 128 data, moving on the frequency axis to take data in one after another.



Interpolation

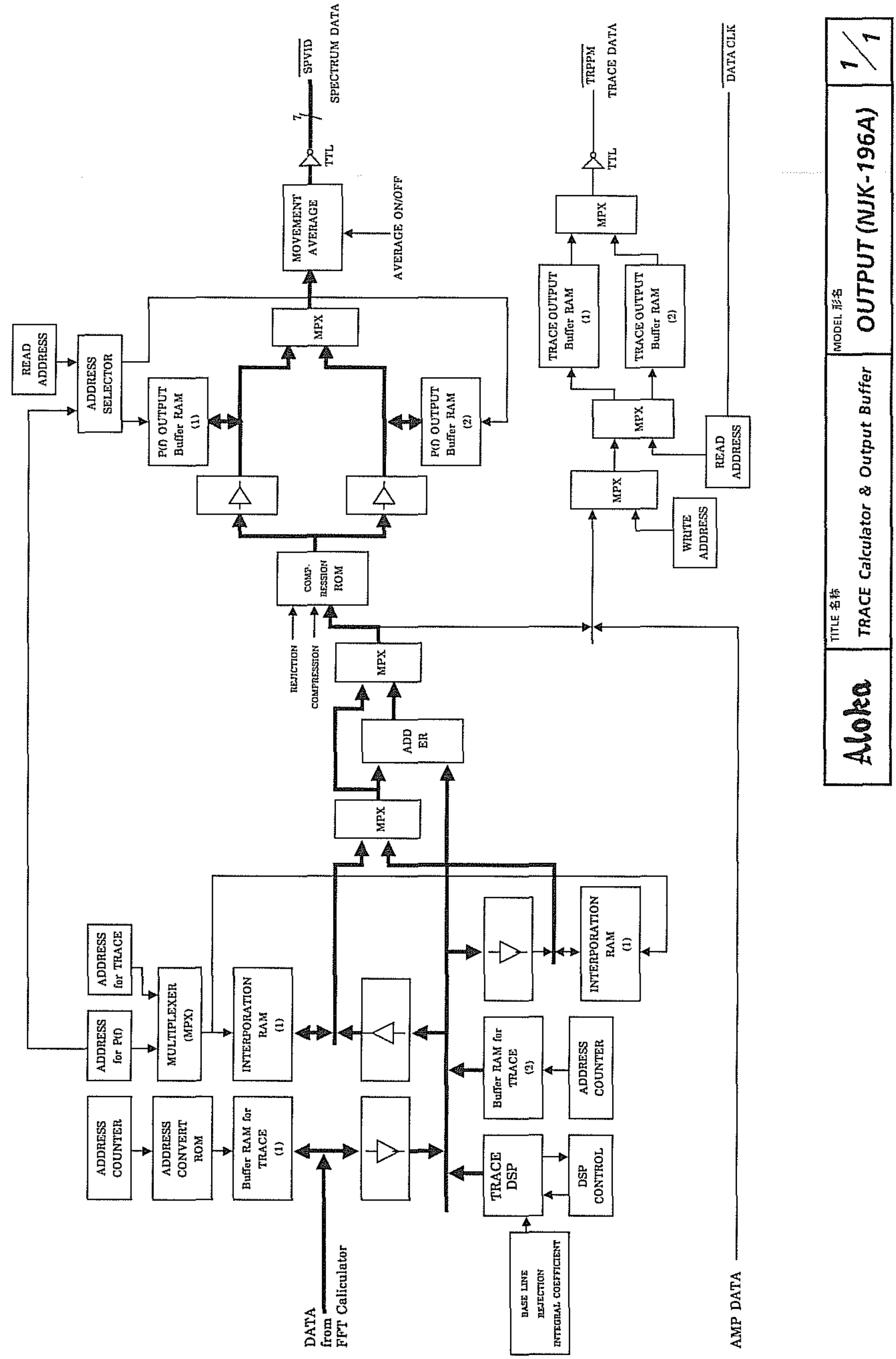

P(f)
P_0
P_1
P_2
f
P(f)
Average of three points
$P(f)_1 = \frac{1}{2}\{\frac{1}{2}P_0 + P_1 + \frac{1}{2}P_2\}$
f
$P(f)_1$

Moving average

Interpolation is made as follows: When data is transferred to the trace buffer RAM (2), the data is written to the interpolation RAM (1) or RAM (2) at the same time. In parallel with this operation, data is read out from the interpolation RAM (1) or RAM (2) which stores the preceding data and being not used for writing in of current data.

The data to which the preceding data is added is transferred to the P(f) output buffer RAM. Before arrival of the next new data from the power operation unit, the OUTPUT PCB reads out data from the interpolation RAM to use it as the data not used for interpolation data. On receipt of the new data, the interpolation RAM (1) and RAM (2) alternate with each other in the read/write function and repeat the above-mentioned operation to output the next interpolation data. For trace data, interpolation of TRACE DSP output is made in the same manner.

Moving average processing on the frequency axis is made when spectrum data is transferred from the P(f) output buffer RAM to the host unit. Output from each stage of three-stage shift register is added together.


DATA from FFT Calculator
ADDRESS COUNTER
ADDRESS CONVERT ROM
Buffer RAM for TRACE (1)
ADDRESS for P(f)
ADDRESS for TRACE
MULTIPLEXER (MPX)
INTERPORATION RAM (1)
TRACE DSP
DSP CONTROL
BASE LINE REJECTION INTEGRAL COEFFICIENT
Buffer RAM for TRACE (2)
ADDRESS COUNTER
INTERPORATION RAM (1)
MPX
ADD ER
MPX
REJECTION
COMPRESSION
COMP-RESSION ROM
P(f) OUTPUT Buffer RAM (1)
P(f) OUTPUT Buffer RAM (2)
READ ADDRESS
ADDRESS SELECTOR
MPX
MOVEMENT AVERAGE
AVERAGE ON/OFF
TTL
7
SPVID
SPECTRUM DATA
WRITE ADDRESS
MPX
READ ADDRESS
MPX
TRACE OUTPUT Buffer RAM (1)
TRACE OUTPUT Buffer RAM (2)
MPX
TTL
TRPPM
TRACE DATA
DATA CLK
AMP DATA
Aloka
TITLE 名称
TRACE Calculator & Output Buffer
MODEL 形名
OUTPUT (NJK-196A)
1/1

16-35 EP-3117 PHYSIO AMP

1. General

   This board composed with ECG AMP and R-WAVE DETECTOR.

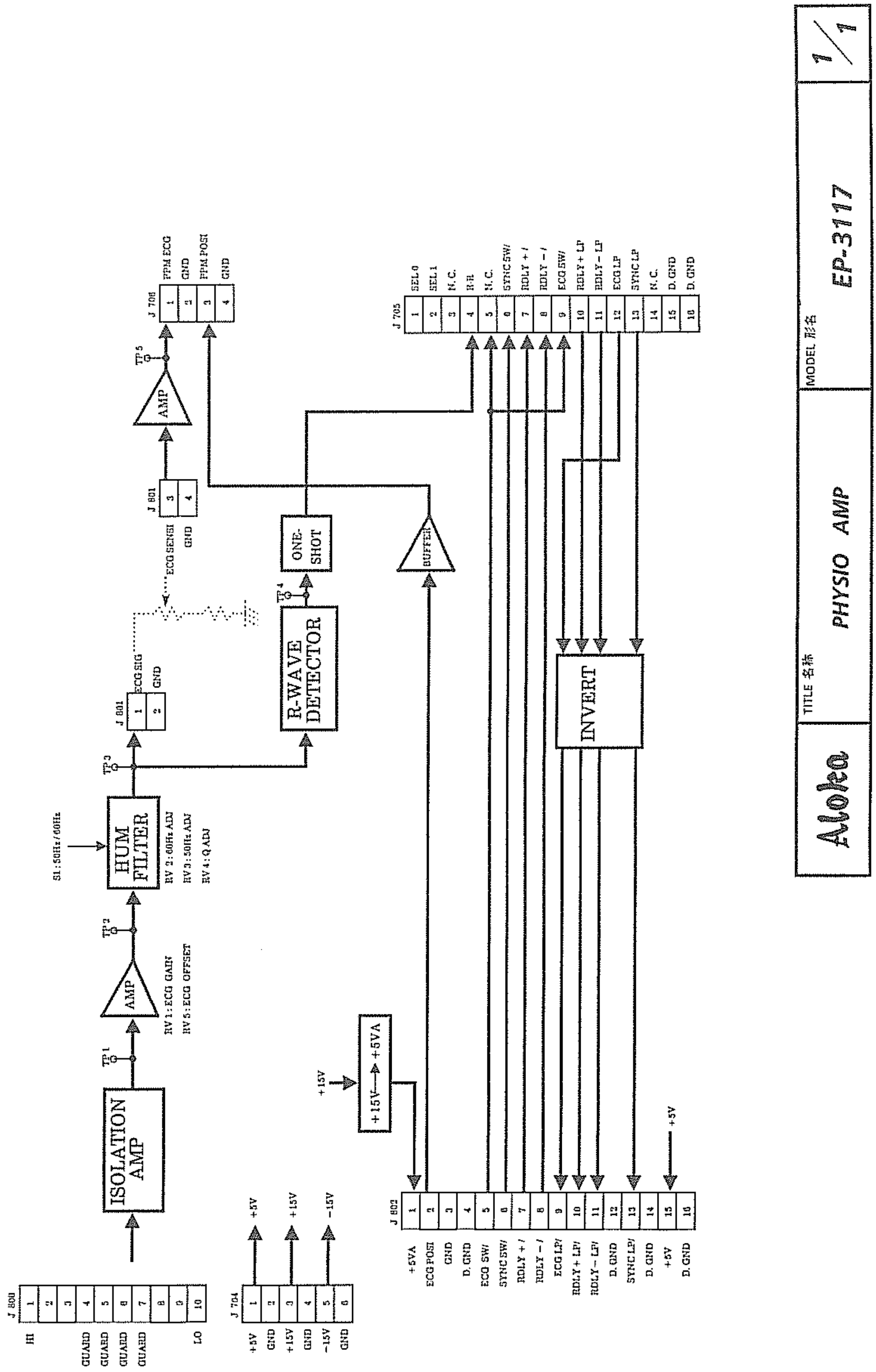
2. Operation

   (1) ECG AMP

   ECG signal is amplified by ISOLATION AMP, and pass through HUM FILTER.

   (2) R-WAVE DETECTOR

   This circuit detect R wave from ECG waveform.


ISOLATION AMP
AMP
RV 1 : ECG GAIN
RV 5 : ECG OFFSET
HUM FILTER
S1 : 50Hz / 60Hz
RV 2 : 60Hz ADJ
RV 3 : 50Hz ADJ
RV 4 : Q ADJ
TP1
TP2
TP3
TP4
TP5
R-WAVE DETECTOR
ONE-SHOT
BUFFER
INVERT
+15V → +5VA
+15V
+5V
-15V
J 800
HI
GUARD
GUARD
GUARD
GUARD
LO
J 704
+5V
GND
+15V
GND
-15V
GND
J 801
ECG SIG
GND
ECG SENSE
J 706
FPM ECG
GND
FPM POSI
GND
J 705
SEL 0
SEL 1
N.C.
R-R
N.C.
SYNC SW/
RDLY + /
RDLY - /
ECG SW/
RDLY + LP
RDLY - LP
ECG LP
SYNC LP
N.C.
D. GND
D. GND
J 802
+5VA
ECG POSI
GND
D. GND
ECG SW/
SYNC SW/
RDLY + /
RDLY - /
ECG LP/
RDLY + LP/
RDLY - LP/
D. GND
SYNC LP/
D. GND
+5V
D. GND
Aloka
TITLE 名称
PHYSIO AMP
MODEL 形名
EP-3117
1/1

16-36 EP-2841 ECG MEMORY

1. General

This PC converts the physiological signals into image signals and makes it possible to freeze the image, as like the supersound echo image, by writing those signals in the memory. With this PC, the physiological signals are displayed in the manner of overlay, like graphic display, in the B-mode, and displayed as PPM on the M image in the case of B/M, M-mode.

2. Operation

1) Overlay part

ECG signal from the physiological-signal amplifier passes through the amp-buffer and is converted by the A/D converter into 6-bit digital signal. The converted date is sent through the latch to the line memory which writes in the data.

The line memory, which is in sync with horizontal synchronization of TV, writes in data during the period of erasion of TV picture and reads out the data during the period of display. The readout address is counted up from the written address because of the necessity of scroll operation.

The readout data is the amplitude data of EGC signal which varies with time, though the overlay signal for display use needs the time data for each amplitude. So, the data read out from the memory is processed in the interpolation circuit for the purposes of necessary convertion and smoothed display. The processed data is controlled by display enable signal, etc. and is outputted to OVLY/ of the body through the open collector.

For the EGC SYNC MARK, ECGFM/ which the body sends out in sync with the R-R is written in the memory as bit 6 of the physiological signal data, and the data read out from the memory is latched by 12 MHz and sent to the output control part.

Memory bit 7 records information of erase. As for as this bit exists, the byte data including this bit is regarded as being erased and is not displayed.

2) PPM part

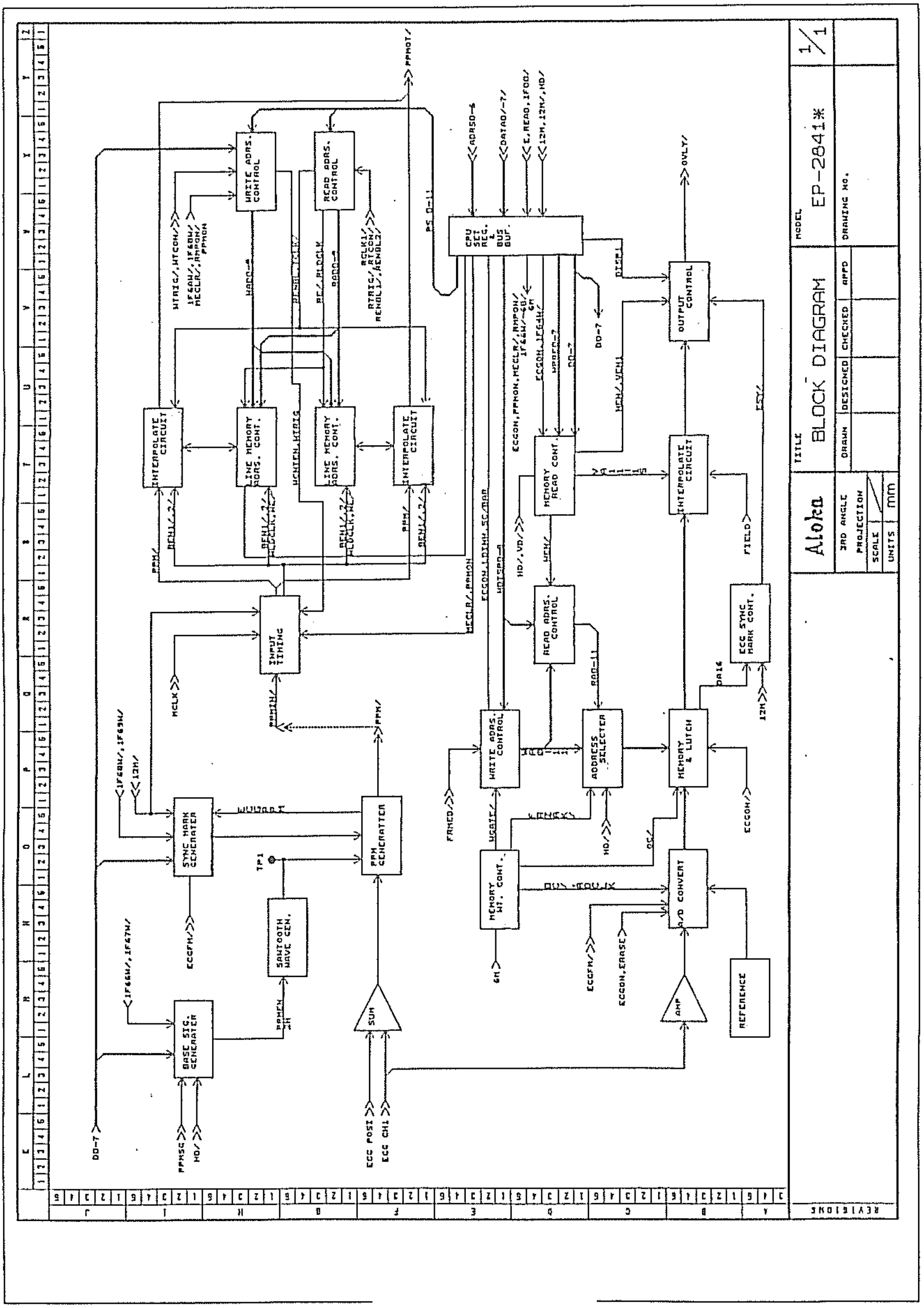
ECG signal from the physiological-signal amplifier is sent through the addition circuit, where the signal is added to the position signal is added to the position signal from the physiological unit, to the PPM modulator.

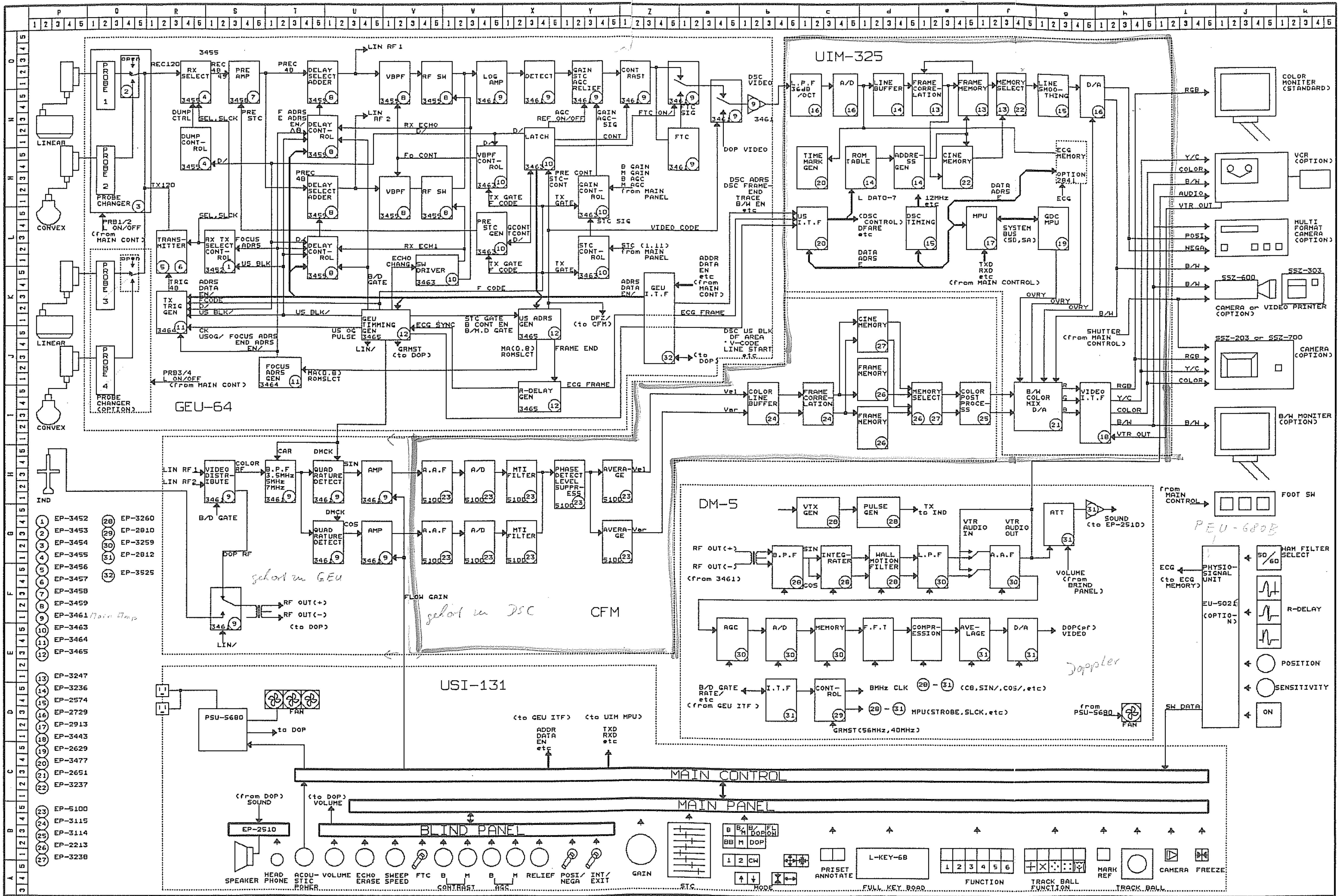
Saw tooth wave, the basic signal of PPM, is made from PPMSG sent out by the recorder interface if the optional interface is in use, or from HD/ if the optional interface is not in use. The ECG signal is PPM modulated by this saw tooth wave and is outputted as PPM/. The output signal is sent transitionally to the mother board and returns as PPMIN/ to this PC again.

Sending of PPM signal is timed with writing-in timing of the memory. Two memories and two interpolation circuits are used so that writing in to and reading out from the memory are made alternately (called the "pingpong" operation) for each line of M image.

The PPM signal timed at writing to the memory is sent to the interpolation circuit. Since writing to the memory is made more frequently than reading out of the memory, the interpolation circuit holds the written PPM signals until they are read out.

PPM signal read out from the memory is processed in the interpolation circuit so that it is distributed to two pixels and, then, is outputted to the mother board through the open collectors.


WRITE ADRS. CONTROL
READ ADRS. CONTROL
INTERPOLATE CIRCUIT
LINE MEMORY ADRS. CONT.
LINE MEMORY ADRS. CONT.
INTERPOLATE CIRCUIT
INPUT TIMING
SYNC MARK GENERATER
PPM GENERATER
SAWTOOTH WAVE GEN.
BASE SIG. GENERATER
SUM
TP1
CPU SET REG. & BUS BUF.
MEMORY READ CONT.
OUTPUT CONTROL
INTERPOLATE CIRCUIT
READ ADRS. CONTROL
ECG SYNC MARK CONT.
WRITE ADRS. CONTROL
ADDRESS SELECTER
MEMORY & LATCH
MEMORY WT. CONT.
A/D CONVERT
AMP
REFERENCE
ECG POSI
ECG CH1
DD-7
PPMSG
HD/
PPMOT/
ADRS0-6
DATA0/-7/
OVLY/
FIELD
12M/
ECGON/
Aloka
TITLE
BLOCK DIAGRAM
MODEL
EP-2841*
1/1
DRAWING NO.
3RD ANGLE PROJECTION
SCALE
UNITS
mm
DRAWN
DESIGNED
CHECKED
APPD
REVISIONS


GEU-64
UIM-325
CFM
DM-5
USI-131
MAIN CONTROL
MAIN PANEL
BLIND PANEL
PROBE 1
PROBE 2
PROBE 3
PROBE 4
PROBE CHANGER
PROBE CHANGER (OPTION)
LINEAR
CONVEX
IND
RX SELECT
PRE AMP
DELAY SELECT ADDER
DELAY CONTROL
VBPF
RF SW
LOG AMP
DETECT
GAIN STC AGC RELIEF
CONT RAST
FTC
LATCH
DUMP CONTROL
TRANSMITTER
RX TX SELECT CONTROL
TX TRIG GEN
GEU TIMING GEN
US ADRS GEN
FOCUS ADRS GEN
R-DELAY GEN
GEU I.T.F
SW DRIVER
PRE STC GEN
STC CONTROL
GAIN CONTROL
VBPF CONTROL
L.P.F 36dB/OCT
A/D
LINE BUFFER
FRAME CORRELATION
FRAME MEMORY
MEMORY SELECT
LINE SHOOTHING
D/A
TIME MARK GEN
ROM TABLE
ADDRESS GEN
CINE MEMORY
ECG MEMORY (OPTION) 2841
US I.T.F
DSC TIMING
MPU
GDC MPU
SYSTEM BUS (SD,SA)
COLOR LINE BUFFER
COLOR POST PROCESS
B/W COLOR MIX D/A
VIDEO I.T.F
VIDEO DISTRIBUTE
B.P.F 3.5MHz 5MHz 7MHz
QUADRATURE DETECT
AMP
A.A.F
MTI FILTER
PHASE DETECT LEVEL SUPPRESS
AVERAGE
VTX GEN
PULSE GEN
INTEGRATER
HALL MOTION FILTER
L.P.F
ATT
AGC
MEMORY
F.F.T
COMPRESSION
AVERAGE
I.T.F
CONTROL
PSU-5680
FAN
EP-2510
PHYSIO-SIGNAL UNIT
EU-5021 (OPTION)
COLOR MONITER (STANDARD)
VCR (OPTION)
MULTI FORMAT CAMERA (OPTION)
SSZ-600
SSZ-303
CAMERA or VIDEO PRINTER (OPTION)
SSZ-203 or SSZ-700
CAMERA (OPTION)
B/W MONITER (OPTION)
FOOT SW
HAM FILTER SELECT
R-DELAY
POSITION
SENSITIVITY
ON
SPEAKER
HEAD PHONE
ACOUSTIC POWER
VOLUME
ECHO ERASE
SWEEP SPEED
FTC
CONTRAST
AGC
RELIEF
POSI/NEGA
INT/EXIT
GAIN
STC
MODE
PRISET ANNOTATE
L-KEY-68
FULL KEY BOARD
FUNCTION
TRACK BALL FUNCTION
MARK REF
TRACK BALL
CAMERA
FREEZE
① EP-3452
② EP-3453
③ EP-3454
④ EP-3455
⑤ EP-3456
⑥ EP-3457
⑦ EP-3458
⑧ EP-3459
⑨ EP-3461 Main Amp
⑩ EP-3463
⑪ EP-3464
⑫ EP-3465
⑬ EP-3247
⑭ EP-3236
⑮ EP-2574
⑯ EP-2729
⑰ EP-2913
⑱ EP-3443
⑲ EP-2629
⑳ EP-3477
㉑ EP-2651
㉒ EP-3237
㉓ EP-5100
㉔ EP-3115
㉕ EP-3114
㉖ EP-2213
㉗ EP-3238
㉘ EP-3260
㉙ EP-2810
㉚ EP-3259
㉛ EP-2812
(32) EP-3525
gehört zu GEU
gehört zu DSC
PEU-680B
Doppler

Aloka	TITLE SYSTEM BLOCK	MODEL SSD-680EX	1/1
3RD ANGLE PROJECTION	DRAWN | DESIGNED | CHECKED | APPD	DRAWING NO. MA300109	
SCALE			
UNITS mm			

REVISIONS